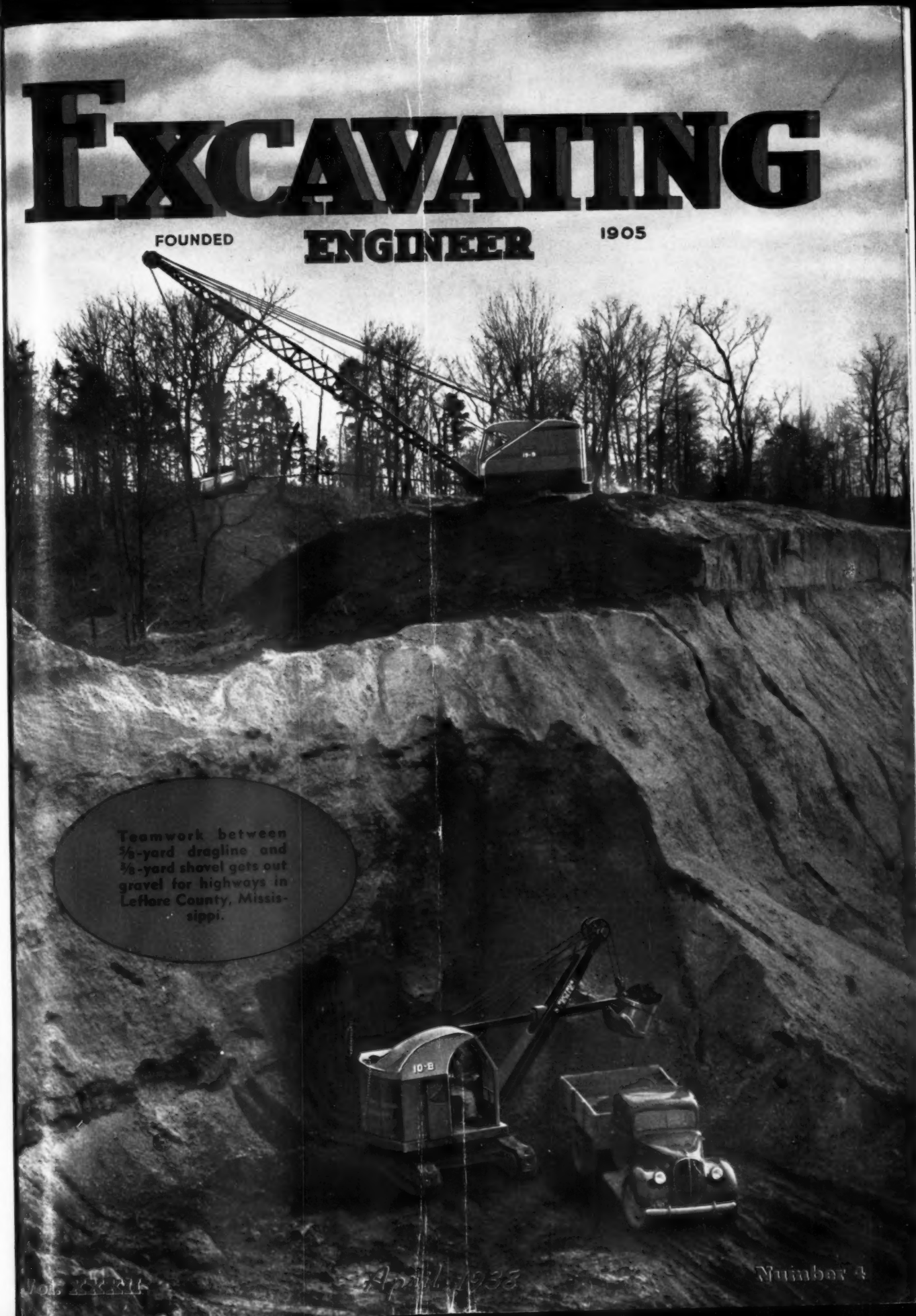
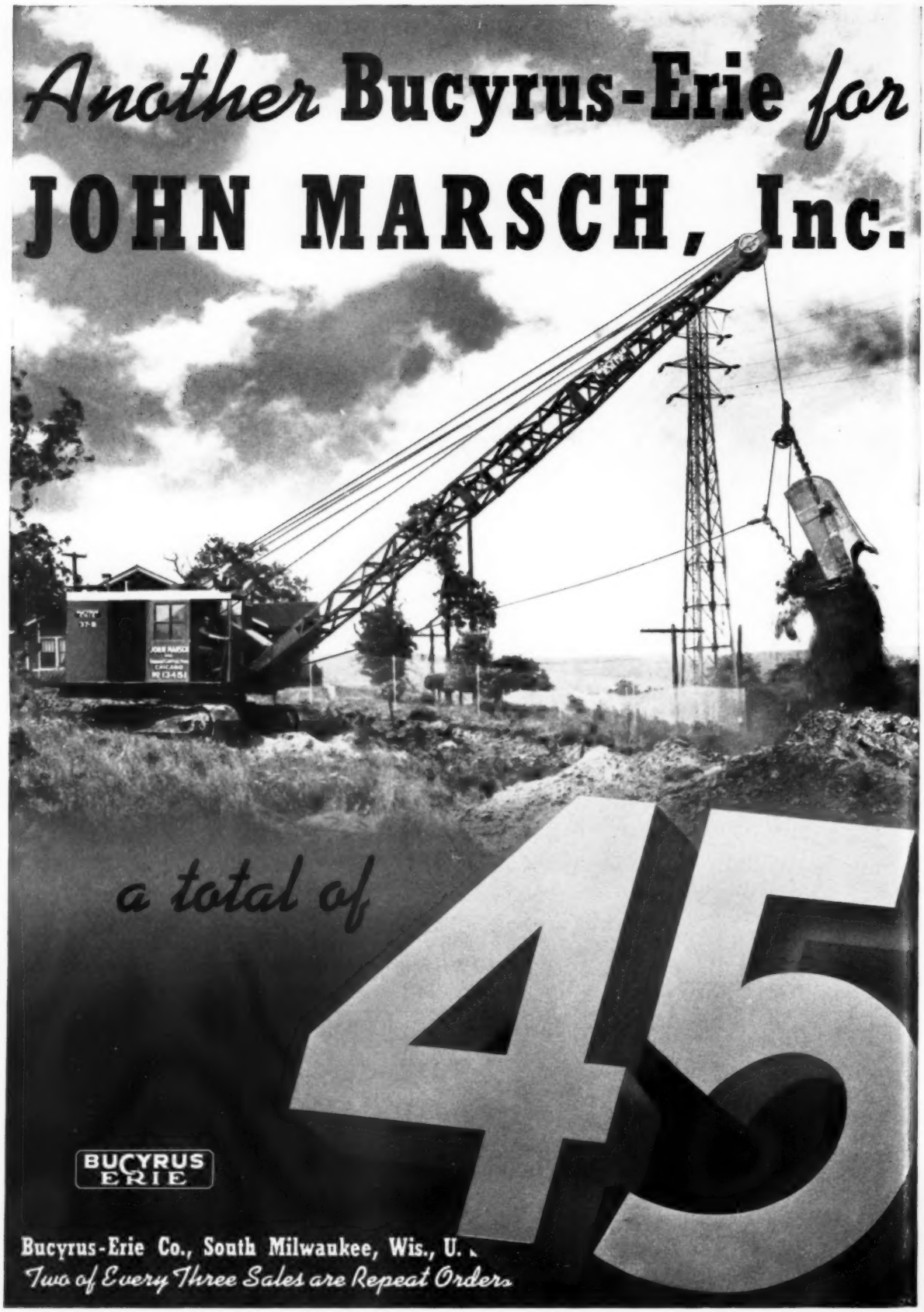
EXCAVATING ENGINEER

FOUNDED 1905



Teamwork between ⅝-yard dragline and ⅜-yard shovel gets out gravel for highways in Leflore County, Mississippi.

Vol. XXXIX April 1935 Number 4


Another Bucyrus-Erie for
JOHN MARSCH, Inc.
a total of
45
BUCYRUS
ERIE
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Two of Every Three Sales are Repeat Orders

EXCAVATING ENGINEER

FOUNDED 1905

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Vol. XXXII **April, 1938** No. 4

Teamwork ..... **Front Cover**

An unusual photograph catches dragline and shovel teamed up to get out gravel for county roads in Mississippi.

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LOOKING AHEAD

These interesting articles will appear in an early issue of EXCAVATING engineer. Watch for them.

Foot Pounds Per Minute

Do you know how efficient your blast-hole drills are? Here's an article that gives you a simple, accurate way to find out.

Nothing Is Impossible

William Z. Williams bets he can dig a hole, and finds himself mixed up with quicksand, a maniac, and sundry other obstacles. Can you guess who wins the bet?

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For your convenience in writing to The Ensign-Bickford Company, you will find a card bound in this issue.

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Stripping

COAL

Central States Collieries use new-type 16-yard stripper in getting out 55,000 tons of coal per month.

ON SEPTEMBER, 3, 1936, operation began at the new Little Sister strip mine of the Central State Collieries, Inc., St. David, Ill. Production has consistently averaged 55,000 tons per month over a period when market conditions would consume that tonnage. It is estimated that coal reserves on this property are sufficient to provide about 12 more years of operation at present rate.

The Little Sister mine is the second stripping operation undertaken by H. J. Sternberg, of St. Louis. The original is at Mindenmine, Mo., operating under the name of the Minden Coal Co. Located in Fulton county, Illinois, Little Sister recovers a seam averaging about 4'10" in thickness. From St. David shipments are made over the Chicago, Burlington & Quincy R. R., and the coal, under the trade name of "Super Test," is distributed in the Northwest and northern Illinois, east to and including Chicago by Walter Bledsoe and Co.

No Blasting Required

With a range from 8 to 55 feet, average overburden thickness at Little Sister mine is 35 feet. Over the coal is found 3 to 4 feet of black slate and cap rock, the latter lies directly on the seam in some areas and in others is separated from it by a layer of black slate. The remainder of the overburden is composed of clay which is removed, without blasting, by a Bucyrus-Erie 550-B electric shovel having a 16 cu. yd. welded steel dipper, counter-balanced hoist, 95 foot boom, and a 68 ft. cylindrical dipper stick with rope crowd. Its capacity, in the overburden being stripped, is 500,000 cu. yds. or better per month.*

Pit Superintendent Wilson explained that time saving devices and methods are always welcome at the mine and that he is pleased with the way digging operations of the stripper continue during the move-up. Stepping over to the shovel, we notice that when the operator is ready for a move-up, he signals the ground man with a horn and just as the swing starts, the ground operator sets loose the power in the four individual cats and the necessary move is made before the machine is ready for its next digging cycle.

* The revolutionary features of the Bucyrus-Erie 950-B "big brother" to the 550-B, were completely described in the April issue of the Excavating Engineer.

Automatic Leveling Saves Time

With a fleet recollection of valuable minutes lost on old-type shovels, Wilson continued to explain how an ingenious mercury switch with leveling mechanism, included in the propelling controls, operates a hydraulic system which maintains a level position for the machine at all times. Should the seam run at a grade or should the supporting material shift or settle, no time is lost in building a level foundation for the machine, for the automatic switch maintains the level. The 550-B is run on three 8-hour shifts daily, stopping only for 10-minute in-

* The picture on the opposite page gives you the 16-yard stripper, 5-yard loading shovel, 23-ton trailer unit, and clean-up bulldozer. At right: Photographer McDaniel of Canton, Illinois, makes a heaping dipperful of coal look "real enough to burn."

• Better than 500,000 yards per month are stripped with this new-type 16-yard shovel at the Central States Collieries Little Sister Mine. Average overburden handled is 35 feet, with minimum and maximum running 8 and 55 feet respectively.

tervals between each shift for greasing.

Just as a reputable blocker needs a speedy ball carrier behind him if they intend to reach "pay dirt," just so the deserving stripper needs a meritorious loader behind it to reach maximum operating efficiency. At Little Sister this team-mate is a Bucyrus-Erie 85-B electric shovel with a 5 cu. yd. welded coal dipper. The average output per 7-hour shift has been 2,800 tons but operators recall the maximum day when 3,600 tons of coal were loaded.

Prior to loading, the 5 ft. seam is drilled with a jack-hammer outfit supplied with air by a 200 c.f.m. Ingersoll-Rand compressor mounted on an auto truck. Shot holes are loaded with Atlas or Hercules pellet powder which is set off with electric squibs. Just ahead of the loading shovel a Caterpillar 45 Diesel tractor with Bucyrus-Erie bulldozer cleans the top of the coal. A washer for coal under 2 in. makes it unnecessary to sweep or use air for cleaning in the pit.

Standard pit width at Little Sister is 70 to 75 ft. Coal is being loaded out of the pit in 40 to 45 ft. strips leaving a 30 ft. coal berm exposed on which the trailer units operate. This width is sufficient to permit the trailer units to turn behind the loading shovel where necessary.

Along with accurate cutting of the floor which insures clean coal with maximum recovery, the loader shapes a proper, coal saving edge in the berm.

Six-Unit Hauling Fleet

Equipped with Firestone Ground Grip tires, four trailer units haul an output of 3,000 to 3,300 tons per 7-hour shift. Each unit consists of a White 691-SD-453 tractor with an Austin-Western trailer car holding an average of 23 tons. One additional White, and one 4 wheel drive Walters truck, each pulling 50,000 lb. capacity Austin-Western trailers, complete the fleet. At present, round-trip haul is 1½ miles, the two last mentioned units were added due to lengthening of pit and haulage road. One of them is used as a stand-by.

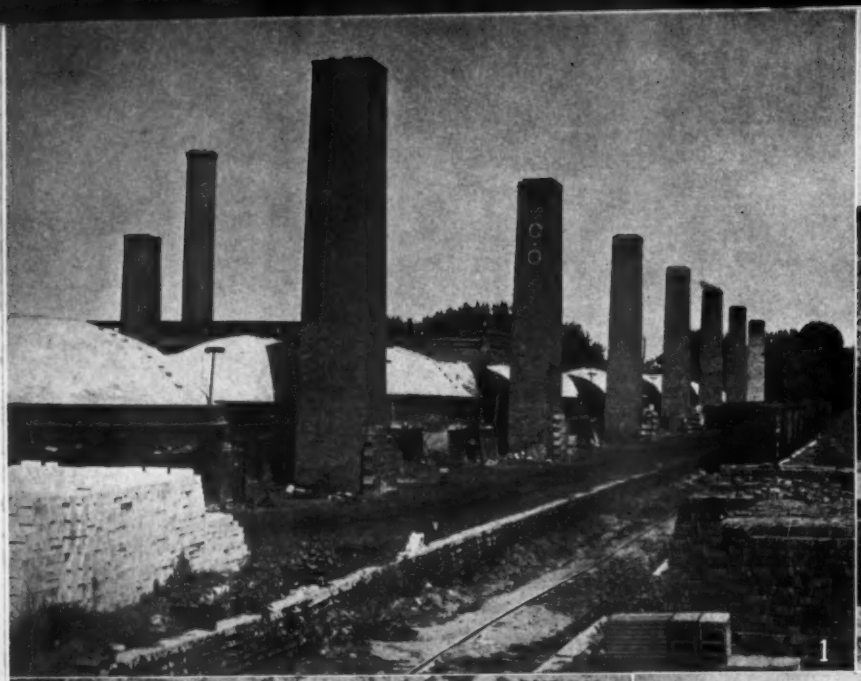
The outlet roadways are built of burnt shale ("red dog") and tipple refuse. Because the coal lies in a long, relatively narrow body running roughly north to south, a circular haul from the dump hopper to the pit and back again was systemized. Main roads are constructed through the spoil bank roughly paralleling the face, with runways into the pit approximately every 1,000 ft. When operations move 1,500 to 2,000 ft. away from the main road, a new road is constructed through the spoil to shorten the length of the runways.

Bulldozer Plays Handy-Man Roll

For this construction work an elevating grader is put to action.

(Continued on Page 242)

—Trucks dump "on the fly" over a 75-ton pper. 2—One of the "red dog" hauling ds that give access to the pit every 1000 t. 3—Shop where trucks are serviced and cessary welding done. 4—Miscellaneous an-up is part of this bulldozer's job. 5—re's plenty of good "Super Test" ready shipment. 6—A real load heaps the 16-d 550-B dipper.



Scrapers

Replace Graders for Clay Stripping

Tractors and scrapers reduce stripping costs for Ochs Brick & Tile Company at Springfield, Minnesota.

MANY users of common brick, face brick of many shades both rough and smooth, structural building brick or tile including load bearing, back-up, face, silo and floor brick in the States of Minnesota, Wisconsin, the Dakotas, Michigan and eastern Montana may never have realized that tractors and scrapers played an important part in the quality of the product they have bought.

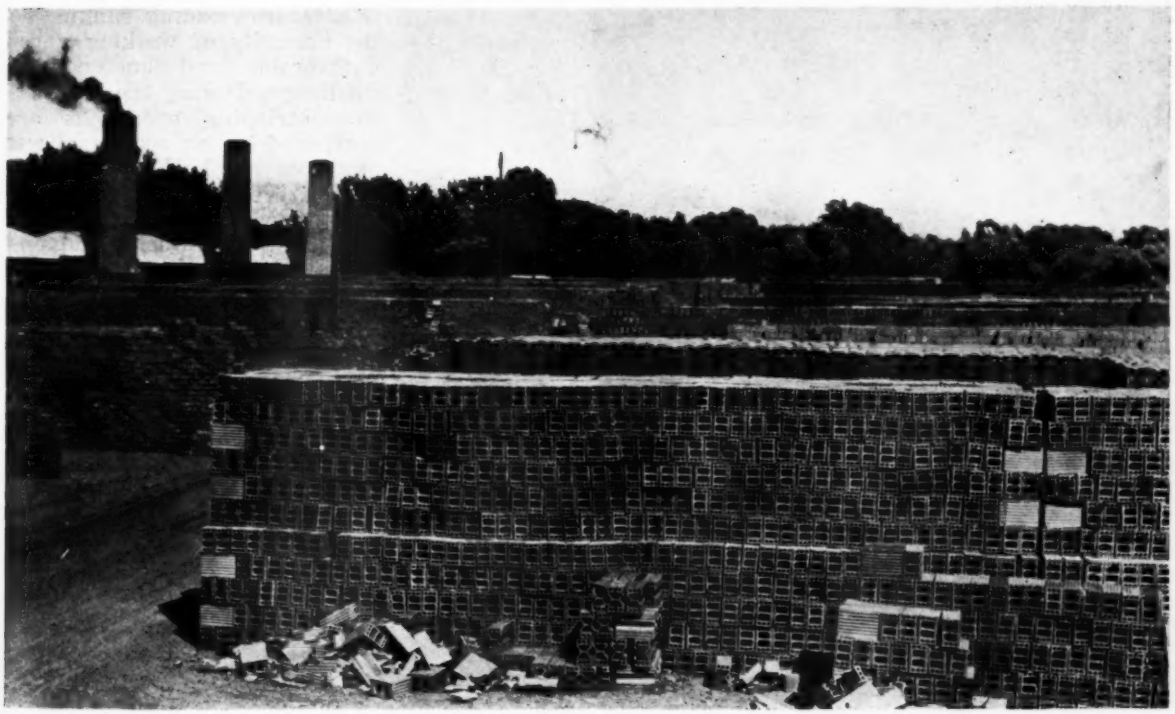
This, however, is precisely the situation for at the 85,000 ton plant of the Ochs Brick & Tile Company, Springfield, Minnesota, Bucyrus-Erie and Continental 5-yard scrapers drawn by International T-40 Diesel TracTractors handle all the stripping required.

Stripping at the Ochs pit for many years was handled by elevating graders owned by the stripping contractor. In 1936 it was decided to handle the stripping with their own equipment and hands, and after investigation, scrapers and Diesel tractors were decided upon as the most efficient and economical method. A 5-yard Continental scraper with International T-40 Diesel TracTractor were placed on the job that year with such success that the following year a Bucyrus-Erie 5-yard scraper and another T-40 Diesel were purchased. Both "teams" have given complete satisfaction —and an accompanying saving in stripping costs.

Slicing the Spoil

The depth of the overburden, which consists of common with few boulders, ranges from approximately 25 to 40 feet with a clay deposit of approximately 30 to 45 feet in depth underneath. The method of uncovering the

• On the opposite page: 1—Sixteen kilns, one chimney to each pair, turn out the brick and tile. 2—For winter operation, this roof is rolled out over the bank, and canvas hung from three sides to provide protection for the loading shovel and keep the clay from freezing. 3—Backing the Continental high on the bank to start a big bite. 4—Iron in the Ochs clay gives a dense, hard brick. The steamer shown here has since been replaced by a Diesel plus Air rig. 5—A two months' supply of clay is kept on hand in this storage house. 6—Slippery going makes the tractor-drawn scrapers ideal stripping units. Here the Bucyrus-Erie skirts a "water hole."
Below: Stock piles were low in 1937. The last row of kilns is behind this tile.



clay which is employed calls for "slicing" the spoil down into the old workings, hauling to the dump around the present loading pit a distance varying from 50 to 500 yards at an angle of 45 degrees to the mining face of the pit. A large enough area is worked so that ready access to the strip pit is obtained at all times through a gentle slope to the part of the mine where loading will follow immediately. Thus the clay is not uncovered until just prior to putting the shovel to work but by "shaving" a sloping cut the overburden itself provides not only a workable strip pit at all times but also makes available clean clay as rapidly as needed, for the final thin cut can be taken in a short time.

The uneven surface of the clay deposit requires constant watchfulness on the part of the stripping crew. At times dirt "pockets" must be dug out of the clay ten feet below the average level of the deposit. These are scooped out with the scrapers without "robbing" the clay—showing excellent control on the part of the operators and instant response on the part of the scrapers.

Beating Old Man Weather

Stripping operations are carried on approximately two years in advance of loading, eliminating the necessity of working under unfavorable and uneconomical conditions. During the wet seasons stripping operations are postponed but an occasional wet day does not hold up the T-40 Diesels even though all appearances indicate that even a crawler mounted tractor would find going impossible.

Loading in the pit is handled by a Bucyrus-Erie DA-2 (Diesel plus Air) which recently replaced an old Thew steamer mounted on traction wheels. A 4 ton Plymouth locomotive hauls the single, side-dump 3 yard car about two hundred yards to the pass track where

• **Top: The uneven surface of the exposed clay deposit is shown clearly in this view. Center: Dewatering is handled with automatic pumps. Bottom: Brick and tile are formed in this mill, which is connected to the storage house by an underground passage for the belt conveyor.**

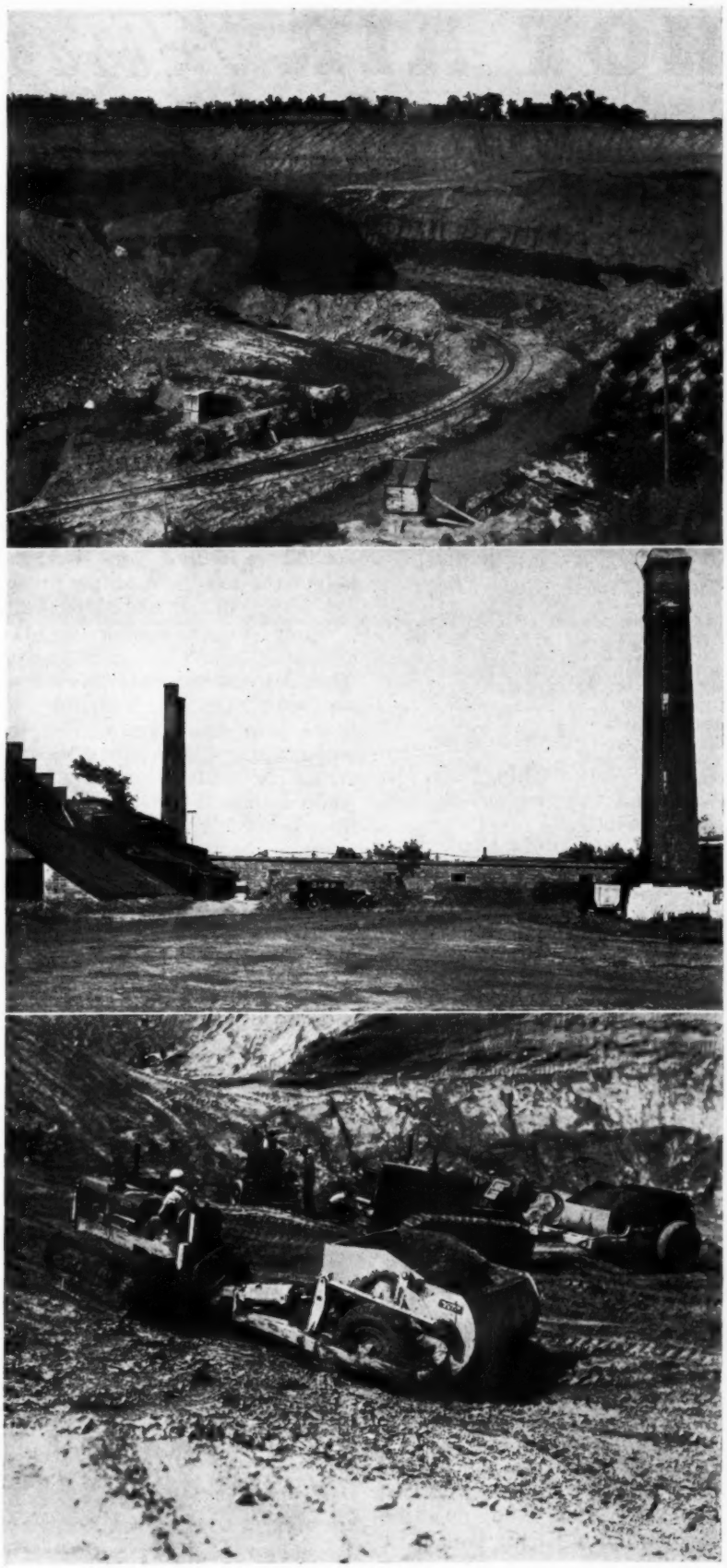
a cable picks up the car for the final 1200 foot trip to the covered storage pile. At least two months' supply of clay is kept on hand at all times giving the plant complete independence insofar as daily pit outputs are concerned.

Processing the Clay

The clay is first put through a granulator to break up any lumps. Disintegrator rolls cut finer and throw out the occasional rock or other foreign body which may be found. Next a fine grinder grinds it to uniform texture. An endless belt takes the finished clay to the storage shed and from there to the mill where the final product is moulded. The brick or tile is then sent to the dryer which gradually takes the moisture out of the clay. Too much heat in the drying process causes cracking. The dried product is then ready for the kilns.

Sixteen kilns handle the burning process at the Ochs plant; about six of which are under fire at one time. It takes a day or better to load a kiln (by hand). Firing, in which the temperature is brought to 2200 degrees fahrenheit, takes about eight days. Five days after the fires are pulled blowers are required to cool off the kilns so men can unload the finished brick. A single burning produces brick of different colors —old rose, light and dark red, light and dark brown, gunmetal and black. Sorting for color is done in the storage yard after which the brick is ready for shipping. Most of the Ochs output is shipped by rail but 60% of the orders within a 75 mile radius of Springfield are shipped by truck.

Founded in 1891 by A. C. Ochs, the Ochs Brick & Tile Company has prospered under efficient management. Mr. Ochs has retired from active management, having turned over the many responsibilities to his sons, Arthur C., Vice President and General Manager, and Walter, Superintendent and Secretary-Treasurer. G. J. Puchner is office manager.



• Top: This view shows the sloping surface of the pit. The dump is at the extreme left, the pump house in the center. Center: Modern shop is located between power house and mill. Bottom: The two scrapers head for the dump at the same time.

HOT AIR *Rises*

With big money at stake, our Mr. Williams decides to invent a fuel-less shovel. He finds reversal a success. More gray hairs for D. Itch; more laughs for you.

By FREDRIC BROWN

Telegram from William Z. Williams, Sonova Beach, Indiana, to D. Itch, President, the D. Itch Digger Co., Circle Center, Ohio:

DO YOU HAVE A STEAM SHOVEL THAT WORKS BY WATER POWER QUESTIONMARK IF SO SEND A ONE YARD CONSIGNED TO ME AT SONOVA BEACH INDIANA IF NOT SHIP STANDARD SHOVEL

WILLIAM Z. WILLIAMS

Telegram from D. Itch, President, the D. Itch Digger Co., Circle Center, Ohio, to William Z. Williams, Sonova Beach, Ind.:

I THINK I MUST BE CRAZY EVEN TO CONSIDER DOING BUSINESS WITH YOU STOP HAVE HEADACHE WONDERING HOW YOU THINK A SHOVEL COULD POSSIBLY WORK BY WATER POWER STOP AM SHIPPING STANDARD ONE YARD MODEL SEVEN WHAT ARE YOU DOING IN INDIANA

D. ITCH

"New York calling Mr. D. Itch," said the voice of the operator, sweetly.

"Put 'em on," said Mr. Itch sleepily. He had just dozed at his desk and awakened from a dream of a shovel operating by a large paddle-wheel painted pink and turned by the spray from a garden-hose.

"Hello, Mr. Itch? This is William Williams, calling from New York. Is this you, Mr. Itch?"

"New York? But how can you be in New York, Williams? I got a telegram from you from Indiana only three hours ago and sent an answer. And now you telephone from New York! Is it a gag, or was the telegram wrong or —"

"No, Mr. Itch. I'm in New York, and I haven't gone to Indiana yet. I sent the telegram that way just so as not to confuse you, Mr. Itch."

"So as not to —"

"Yes. I'm leaving for Indiana shortly and thought I might be there by the time you answered the telegram, and I didn't want to mix you up by wiring from New York and having you answer to Indiana so I insisted that they put an Indiana dateline on the telegram. It's very simple. Then I didn't leave here as soon as I expected."

"But how did you get the reply? Or did you?"

"Yes. When I found out I wasn't taking the plane right away. I had them forward it so I got it here in New York. I guess maybe the telegraph people think I'm a bit goofy or something."

"Only the telegraph people, William?" asked Mr. Itch gently. Then he remembered. "Now listen, what's the idea of giving me more gray hairs getting me to wonder how a shovel can be operated by *water power?* Sometimes I think I should just hang up whenever you call, and . . ."

"Now don't get excited over nothing, Mr. Itch. I *don't* really *want* a water-power shovel. My new idea has nothing to do with water-power, really, but I thought that if there *was* a water-power shovel it would be easier to adapt it to run without fuel because there wouldn't be a motor to disconnect, and . . ."

"Just a minute, William! Either this connection is bad, or you said something about running a shovel without fuel. I hope the connection is bad, and if you'll just wait until I get the operator, and . . ."

"No, Mr. Itch. You heard me right. I said no fuel, but of course I'll have plenty of *power*. Have you ever realized, Mr. Itch, how much power there is in wind?"

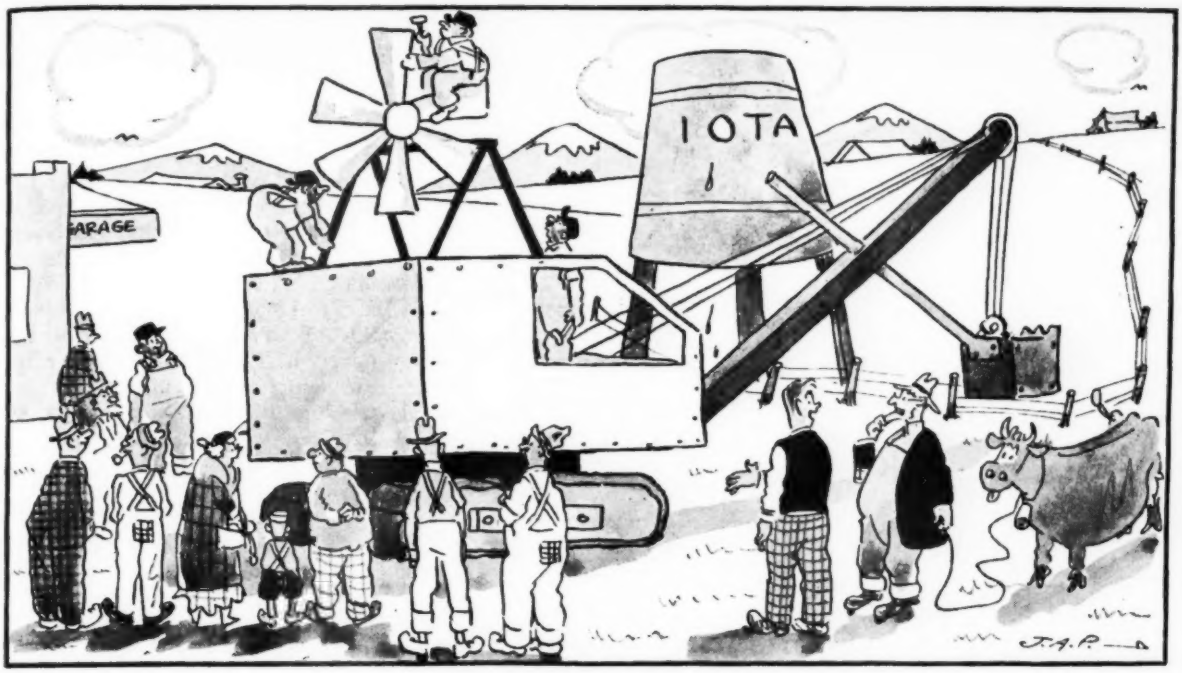
"In *what?*"

"Wind, Mr. Itch. It turns windmills and sails ships and blows barns into the next county, but nobody has happened to think of using it to run a shovel! When my idea is perfected, I'll give you first chance to manufacture them."

"William, I've stood a lot of kidding in my time, but —"

"I'm *not* joking, Mr. Itch. Why not? On top of the shovel housing will be an upright girder and a windmill wheel with vanes will be at the top and a pulley to the gear box. If the wind will run grist

" . . . just awakened from a dream."



" . . . so we'll use the wind to power the shovel."

mills and well pumps, why not? It's just working out the details."

"But in the name of . . ."

"There's always *some* wind, Mr. Itch. I've studied about wind. It's caused by air over a certain area getting hot and rising and the surrounding air rushing in. Meteorology is interesting."

"Meteorology? What's meteors got to do with it? But anyway, why not sunlight, or tides, or — why pick on wind?"

"I know it sounds funny at first, Mr. Itch. Like Marconi with the phonograph. But it's practical because the earth doesn't heat uniformly and that makes wind. Hot air always rises."

"Then what, William," demanded Mr. Itch, "is holding *you* down?" Gently he replaced the receiver on the hook and sat staring at the telephone.

Telegram from William Z. Williams, New York, N. Y. to D. Itch, President, the D. Itch Digger Co., Circle Center, Ohio:

SHOVEL NOT HERE YET STOP PLEASE RUSH

WILLIAMS

Telegram from D. Itch to William Z. Williams, New York, N. Y.:

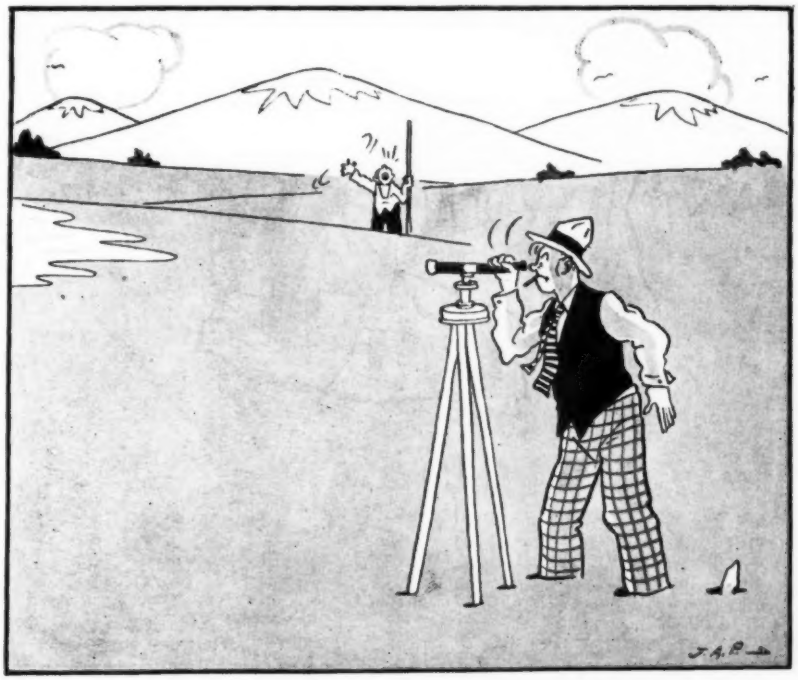
SHIPPED SHOVEL YESTERDAY TO SONOVA BEACH INDIANA STOP NOW YOU WIRE THAT IT IS NOT IN NEW YORK YET STOP ANYWAY IT WONT GET TO INDIANA TILL TOMORROW STOP WHAT IN THE WORD THE TELEGRAPH COMPANY WONT LET ME USE DO YOU EXPECT US TO DO QUESTIONMARK DASH SEND IT BY CARRIER PIGEON OR AIRMAIL STOP SHALL I WIRE RAILROAD REROUTE SHOVEL NEW YORK

D. ITCH

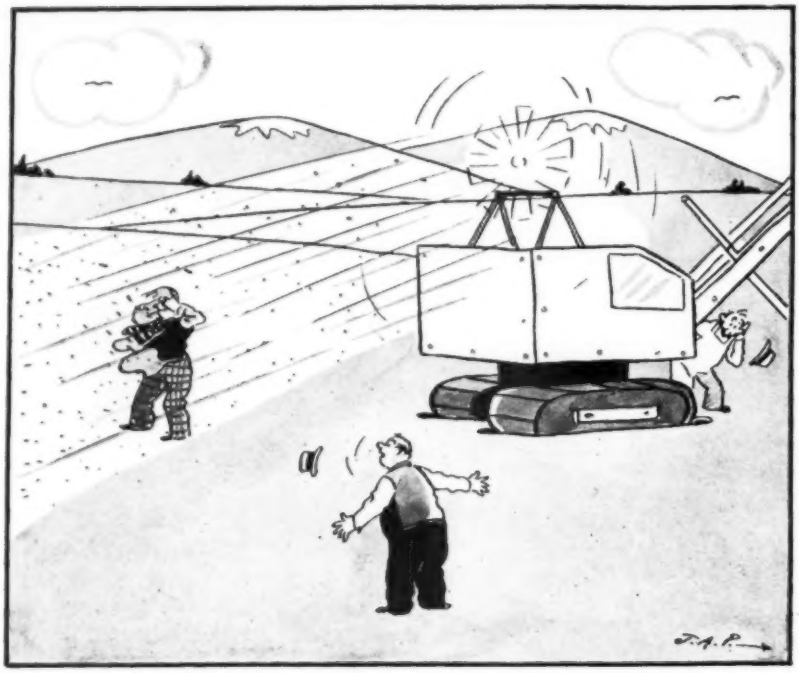
Each time the telephone had rung during the last hour or two, Mr. Itch had picked it up with apprehension. At last the apprehension was justified.

"This is Williams, Mr. Itch. I'm calling from Sonova Beach, Indiana. I just got the answer to my telegram."

"William," said Mr. Itch earnestly. "Will you do me a favor, a



" . . . we're hunting for an 1869 survey plate."



" . . . and it works fine backwards."

big favor? Please *don't* explain why, if you're in Indiana now, your telegram came from New York and I answered it to New York and you got it in Indiana. If you explain—well, I'm just not up to trying to follow you."

"All right, Mr. Itch, I won't explain. But it's very simple. And your shovel made better time enroute than you thought. It's here now, and we're working on it."

"Why try this experiment in Indiana, William? Couldn't you have done it nearer New York?"

"Sure, Mr. Itch, but I have a job excavating here that I promised to do for Mr. Carmody, whom I met in New York. It's a rather unusual job, Mr. Itch."

"It would be, William. All right, I'll bite. What's unusual about it?"

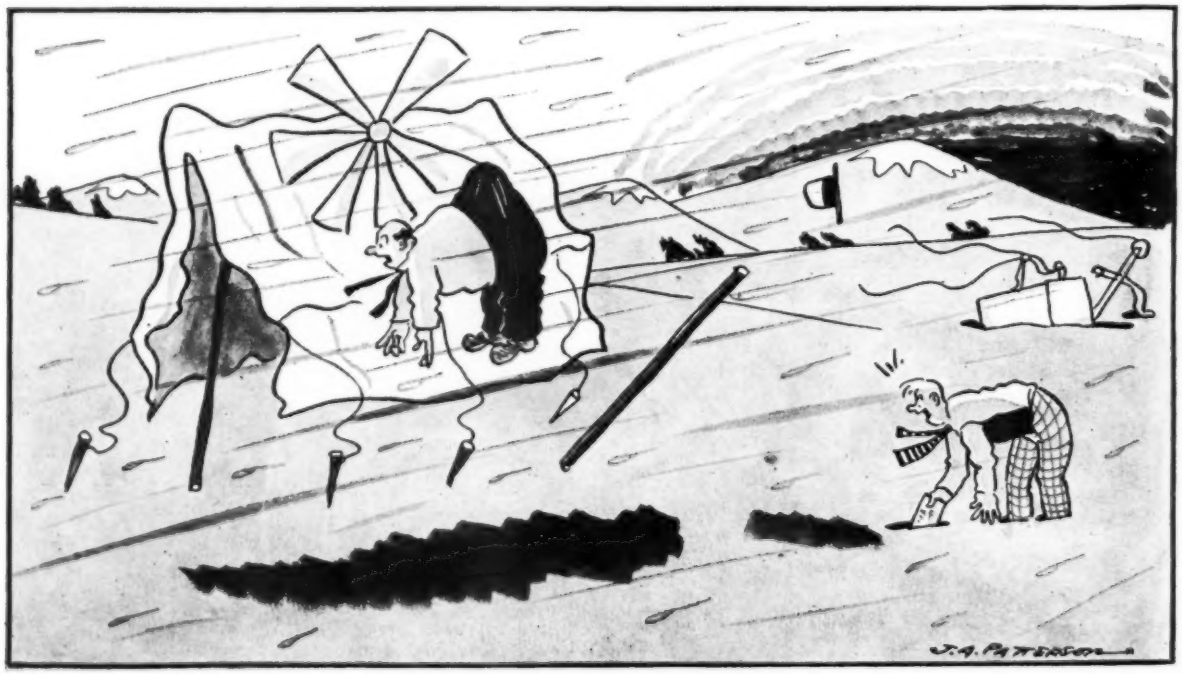
"It's here in the dune country, Mr. Itch, and we're hunting for something—an 1869 survey plate, a small stone plate that was sunk in the ground at that time when a big chunk of public land was sold. Mr. Carmody owns the land, and it's a tremendous tract worth nearly half a million. But he can't prove a clear title unless this survey plate is found. It's awfully involved and legal and I don't understand the details, but a clear title, so he can sell, depends on finding that survey plate."

"But what's that got to do with a job of excavating?"

"This part of the tract, the part where the plate will be found, is dune country, Mr. Itch. It's full of sand dunes and they shift with the wind, and some dune seems to have drifted across the plate. We've surveyed and measured and we think we know which dune."

"I get it. You've got to move a sand dune, then?"

"Yes, Mr. Itch. And if that isn't the right one, we'll have to move another, and so on. Mr. Carmody



" . . . had pitched the tent right on top of it!"

" . . . while I'm vacationing, I'll keep my eyes open."

and I went out there last night and pitched a tent by the dune we're going to move first. He's going to stay out there with me till we move at least the first dune."

"William, you manage to walk into the queerest, most godawful situations that I ever . . ."

"But this one is worth the trouble, Mr. Itch. Mr. Carmody has offered me five thousand dollars if I find that plate. I don't get a cent if I don't. The plate is worth half a million to him, and he can afford to make the offer. But five grand isn't peanut money, Mr. Itch."

"Hmm. I should say *not*, William. But if there is money in this, hadn't you better forget that crazy windmill-shovel idea of yours and get down to business? The idea won't work, and even if it did, what's a little fuel on a gamble like you've got there?"

"It isn't the fuel, Mr. Itch, it's the principle. And it's a good place to try out, because there are strong winds off the lake. And it'll be ready to take to the field tomorrow. There are five mechanics working on it right now."

"Are you intending," asked Mr. Itch, "to equip it with sails to catch a favorable wind at dawn to get it out to the dune, or are you going to use power to get it there?"

Don't worry, Mr. Itch. We're not going to try sails, although . . . no, we won't try that. I'll keep you posted, Mr. Itch. 'Bye."

Telegram from William Z. Williams, Sonova Beach, Indiana, to D. Itch, President, the D. Itch Digger Co., Circle Center, Ohio:

WINDMILL PRINCIPLE WONT GIVE ENOUGH POWER TO OPERATE ONE YARD SHOVEL EVEN LARGER VANES WONT WORK STOP CAN YOU SHIP THREE EIGHTHS YARD SHOVEL IMMEDIATELY

WILLIAMS

Telegram from D. Itch, President, D. Itch Digger Co., Circle Center, Ohio, to William Z. Williams, Sonova Beach, Indiana:

WILL SHIP THREE EIGHTHS YARD SHOVEL TOMORROW STOP WHY NOT FOR ONCE IN YOUR LIFE BE SENSIBLE AND FORGET WINDMILL IDEA AND EARN THAT FIVE THOUSAND INSTEAD

D ITCH

Telegram from William Z. Williams, Sonova Beach, Indiana, to D. Itch, President, the D. Itch Digger Co., Circle Center, Ohio:

CANCEL ORDER FOR SMALL SHOVEL STOP ONE YARD WINDMILL TYPE WORKS FINE IF RUN BACKWARDS

WILLIAMS

"Mr. Itch? This is Williams calling. How are you, Mr. Itch?"

"William, listen. If you ever send me another telegram like that last one of yours . . ."

"Don't get so excited, Mr. Itch. I just called to explain how the shovel-windmill idea worked out fine, as soon as I thought of running it backwards. But it works only on sand dunes, so I guess you wouldn't want to manufacture them."

"William, unless you tell me what you're talking about . . ."

"It's very simple, Mr. Itch. What was it moved the sand dunes in the first place? Wind! So why not reverse the process? Instead of making the windmill work the shovel, which it wouldn't, I connected the shovel Diesel to work the windmill, and I pointed it at the top of a dune and got it as near as I could, and the windmill acts like an electric fan, and the sand starts blowing off the top of the dune and shifting the dune backwards to where it was before!"

"Of all the insane . . . Do you mean to tell me you actually succeeded in moving a sand dune?

"Well, not exactly, Mr. Itch. But it would have moved the dune if the storm hadn't come up off the lake and wrecked the windmill."

Mr. Itch groaned. "Five thousand dollars at stake, and you . . ."

"But I've *got* the five thousand dollars, Mr. Itch. When the storm blew the windmill off the shovel, it fixed everything."

"All right, William, all right. Tell it your own way."

"It's simple, Mr. Itch. You see, the survey plate had been, not under the dune, but right next to it, covered with only a half an inch of sand, and Mr. Carmody and I had pitched the tent right on top of it.

"And when the wind blew the windmill off, one vane caught in the tent and took it along, and it scraped the sand away, and there was the survey plate right in plain sight. The only bad thing is that Mr. Carmody was in the tent."

"What?"

"Oh, he wasn't hurt, Mr. Itch. He managed to fall out of it onto the side of a dune when it was

(Continued on page 244)

EXCAVATING ENGINEER

FOUNDED 1906

A Monthly Publication
Devoted to the Excavating Industry

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A Case for Diversion?

There are many cogent reasons why highway funds should not be diverted to non-highway uses. Whatever reasons may be advanced by "highway-holidayers" for diversion, their case ultimately rests on expediency. (Even in depression times highway taxes bring in huge revenues; there are other worthy causes which need money; why not use some of the fat highway funds for them? We have enough highways, anyway.)

Why not? One of the best answers is contained in the cold facts of the preliminary edition of 1938 Accident Facts, released by the National Safety Council. We quote:

"In the traffic field, an all-time high of 39,700 deaths was reached, and only sharp reductions of 10 per cent in November and December from the corresponding months in 1936 kept the 1937 increase from being even greater. These two months culminated a general improvement in traffic accident rates during the last six months of the year.

"In addition to killing 39,700 persons, traffic accidents permanently disabled 110,000 and temporarily injured 1,250,000 in 1937.

"At the end of June motor vehicle deaths for the six months were 14 per cent over the corresponding period of 1936. Improvement in accident prevention during the next four months cut the 10-month total to 8 per cent over the same period of 1936.

"Then, at a time of year when traffic deaths often increase, the October total of 4,000 deaths was cut sharply to 3,580 in November. And while the number increased slightly to 3,890 in December, this figure still was more than 400 deaths under the December, 1936, figure.

"The 4 per cent rise in traffic deaths in 1937 over 1936 was far less than the 9 per cent increase in vehicle mileage. Consequently, the motor vehicle death rate on a mileage basis declined from 16.6 deaths per 100,000,000 miles in 1936 to 15.9 in 1937—a 4 per cent cut. This is in line with the last dozen years. The total reduction since 1925 has been 20 per cent.

	Motor Vehicle Deaths	Population Rate*	Vehicle Mileage Rate**
1932 . .	29,451	23.6	16.4
1933 . .	31,363	24.9	17.4
1934 . .	36,101	28.5	18.5
1935 . .	36,369	28.5	17.7
1936 . .	38,089	29.7	16.6
1937 est. .	39,700	30.7	15.9

*Deaths per 100,000 population.
**Deaths per 100,000,000 vehicle miles.

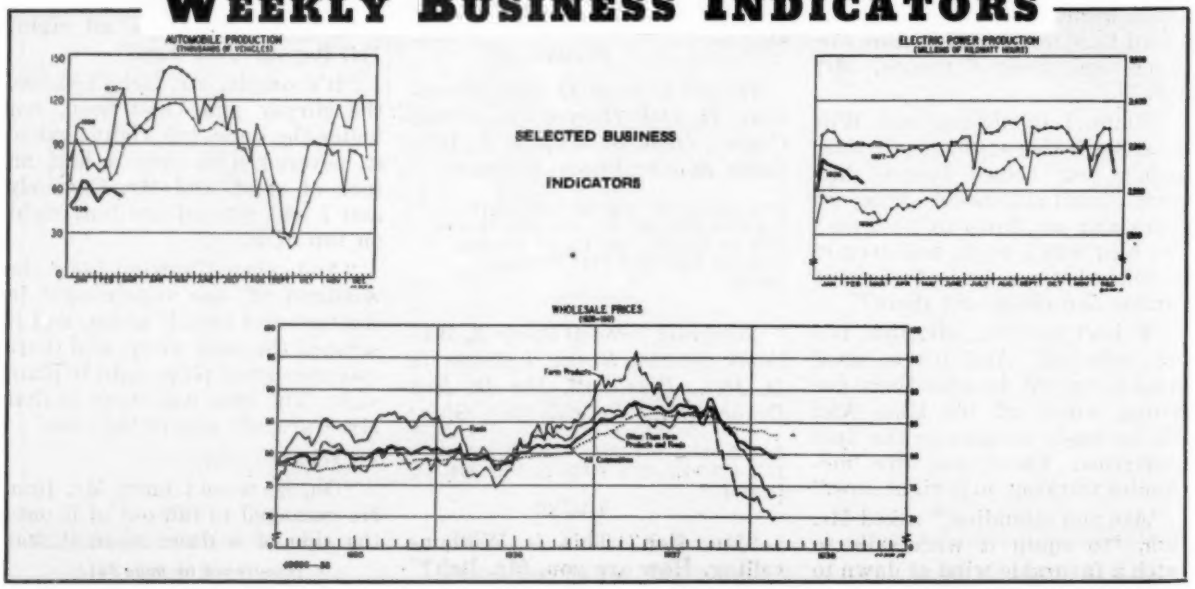
"In 1937 the traffic death rate per 100,000 population was 30.7, compared to 29.7 in 1936. This rate is 62 per cent higher than 1925 and 30 per cent higher than 1933.

"The cost of traffic accidents to the country in 1937 is estimated at approximately $1,740,000,000. This cost is divided evenly between property damage on the one hand and wage losses, medical expense and insurance overhead costs on the other. In 1936 the total cost was $1,640,000,000."

Certainly the ever-growing accident cost and deaths per 100,000 population shown by this report evidence the economic desirability of doing everything possible to reduce traffic accidents. Eliminating diversion won't eliminate the total accident bill. Sustained, cooperative effort on the part of highway builders, educators, law enforcing bodies, legislators, and the public will be necessary to do that. But the accident facts do shout the inadequacy of our highway system. Experts agree that building safe, modern highways is one of the best, if not the best, ways to reduce accidents. Safe highways, then, will pay their way, and more, in cutting down the annual accident bill.

The cost of making our high-

WEEKLY BUSINESS INDICATORS



ways safe is tremendous—too tremendous to permit diverting a penny of the funds that should be used for the purpose. But despite its magnitude, the task must be done. The cost of omitting, or even postponing it is too great.

February Construction

Contracts awarded for building and engineering work in the 37 eastern states during the month of February amounted to $119,-038,000, according to F. W. Dodge Corporation. This was a decline of 37 per cent from February, 1937, and followed a drop in January of 20 per cent from January of last year. Thus the decline of the later months of 1937 has carried through the opening months of the new year. This is the customary course of a recession like the present one, when many projects are deferred pending assurances of construction cost stabilization, change of general business sentiment, and, in the present case, legislative action.

Residential building undertaken in the 37 eastern states rose 10 per cent during February, 1938 as compared with the preceding month. This gain represents the first break in the series of successive monthly declines for residential building which began last June. Residential contracts for February totaled $40,023,000 as compared with $36,207,000 for January. It is currently reported that preliminary applications for mortgage insurance, both on single dwellings and development projects for sale and for rent, have greatly increased since enactment of the new amendments to the National Housing Act; this may be an indication of increased residential building contracts some weeks hence.

Contracts for private building and engineering work amounted to $67,891,000 in February as compared with $74,630,000 for January. Public construction on the contrary, dropped sharply from $120,842,000 for January to $51,-147,000 for February.

By classes of construction, the February contract record amounted to $40,023,000 for residential building, $48,533,000 for non-residential building, $25,333,000 for public works and $5,149,000 for utilities.

A Big Blast

Here's an interesting letter from Old Timer Fred F. Nichols, now living in San Francisco, California. He tells about some construction incidents in the early days.

"Do any of you Old Timers remember when that job was on at Irwin, Pa.? I think Howley had the job. They drilled down with a well drill, on the hillside, and started to load the hole. The hole wouldn't fill up, as it was an entry to a coal mine, so they poured the powder and dynamite into it, and by the time they used up about a carload of explosive, she was full. Well, I don't know who shot the hole, and neither did the police, but I understand that whoever pulled that battery left town right away. The blast leveled off the place; they didn't need a shovel at all. Later, I heard they built the P.R.R. Depot on the spot. I think Ed Luther was the shovel runner. That was about 1898, or perhaps a little earlier.

"A few years later, H. S. Kerbaugh moved the top off the Greensburg Tunnel adjoining the R.R. station there. I've heard it said that Kerbaugh at one time owned 56 Bucyrus shovels and 200 dinkey engines, but I can't verify it. I worked for Kerbaugh at St. Paris, Ohio, doubletracking the Pan Handle R.R., or otherwise the Main Line of the P.R.R. from Pittsburgh to St. Louis. Hansen was the Big Shot, Jimmy Givens, walking boss. Shovel men were Sam Patton, runner Lewy Wagner, Horace Wolf, and an Old Timer called Larrie, who stammered. Cranemen were Jake Hake, Wilcox, and myself. Dinkeyskinners were Billy Carey, Clarence Eastep, Pan Handle Pete, Ed Lehman, and Jean Fisher. Charlie Steinbach was the machinist. We were using model 60 Marions.

"The year before, I craned a 65-ton Bucyrus for T. A. Gillespie Company at Urbana, Ohio, also double-tracking the same road from Hagenbaugh to Urbana—a good job, plenty of quick sand. The whole job would quivver like a dish of nervous pudding (jello). Billy Foley was the Superintendent. Nicholas Bunch and myself were the day crew on the shovel, and Slim McDonald and Eddie Mareenis were the night crew. Dinkeymen were Billy Carey and Clarence Eastep; and John Duffy was the Master Mechanic. We used the old Dixon and old style Porter dinkeys. The latter had the steam dome in the cab and hand brakes. The Dixons had no brakes so we used a Johnson bar."

Thanks, Mr. Nichols.

"We have a fire department in our town that has only one hose car and two dogs."

"What are the dogs for?"

"To find the hydrant."

M. A. Long

Maurice Alvin Long, founder and President of The M. A. Long Company, nationally known engineering and contracting firm, with headquarters at Baltimore, Maryland, died at his home in Baltimore on February 27, 1938. He was sixty two.

At the time of his death, Mr. Long was chairman of the Board of Directors of the Western Maryland Railway Company. He was a banker and business executive connected with many enterprises.

Mr. Long was born on a farm near Middletown, Ohio. After he was graduated from the Public High School there, he educated himself solely through correspondence courses in Architecture and Civil Engineering. After two years in private practice, he entered the employ of the Baltimore and Ohio Railroad Company, and rose to the position of Architect and Assistant Chief Engineer, where he had full charge of the design and construction of all building work on the entire system for more than twenty years.

In 1919, after resigning his post with the Baltimore and Ohio, Mr. Long established the company which bears his name, and has erected many notable structures throughout the United States.

He was a member of the American Society of Civil Engineers, the American Railway Engineering Association, The Pennsylvania Society of Professional Engineers, The Maryland Academy of Sciences, and was past President of the Maryland Chapter of the Associated General Contractors of America.

Mr. Long is survived by his wife and two daughters, Mrs. J. Cookman Boyd, Jr. of Baltimore and Mrs. D. Murray Cheston, III of Hawaii.

GILA VALLEY CANAL

Hard digging marks the excavation of Arizona channel.

By JOS. C. COYLE

CONTRACTS for the first seventeen miles of the Gila Valley Canal were let by the United States Bureau of Reclamation in April, 1936. With the All-American Canal in California nearing completion, this companion project on the Arizona side of the Colorado river marks the next step toward the agricultural development made possible by Boulder Dam. The gravity section of the canal, now under construction from Imperial Dam to the edge of the Yuma frostless mesa, will have sufficient capacity to irrigate 150,000 acres in the Gila river valley and on the Yuma mesa. Eventual development of the project is planned to irrigate a total of about 585,000 acres, including similar lands in Mohawk and San Cristobal valleys, east of the Gila range. Two miles of tunnel through the range will be required. Only construction of the 17-mile gravity canal is definitely planned at present.

The gravity canal now being excavated passes through the Laguna Mountains in two tunnels, then follows the west base of the range to the edge of the mesa, crossing the Gila river in a reinforced concrete siphon. It will water an area of fertile land at the confluence of the Gila and Colorado rivers, part of which is irrigated now from another canal heading at the Laguna dam. Plans have been made for a pump lift of about 85 feet to raise the water on to the mesa when the canal is extended. Power for this lift, and others which may be used to deliver water east of the Gila Mountains, will come from Parker and Boulder dams.

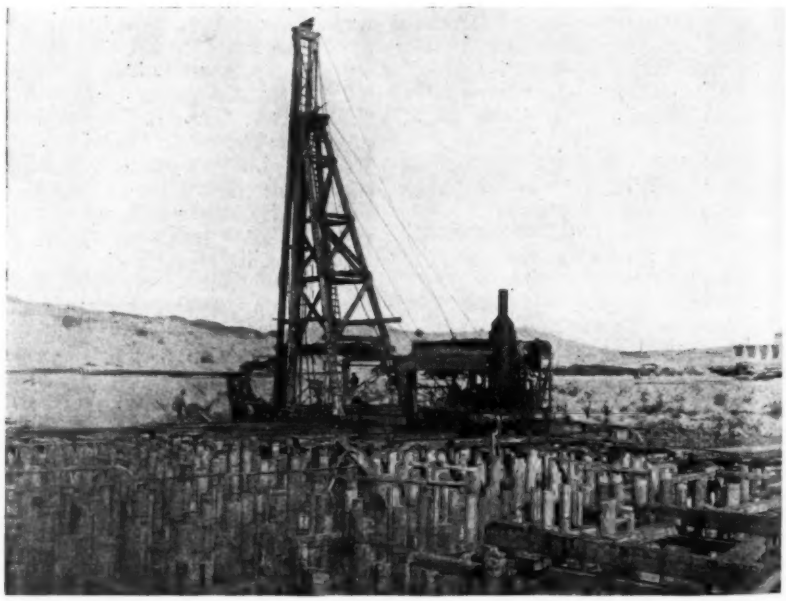
Yuma Mesa reaches from Yuma Valley and the Gila Valley southward to Mexico and east to the Gila range, comprising about 139,000 acres. It has been found ideal for the growth of grapefruit, having the least annual rainfall and the most sunshine of any citrus growing region in the United States.

Allowing for Future Expansion

Cost of the first unit of the canal, estimated at $20,000,000, is to be repaid without interest, over a period of forty years, by the Gila Valley Irrigation District. The gravity canal is 22 feet wide in the bottom, 76 feet at water line and the water will be 13½ feet deep, with 6 foot freeboard. A 30 foot road will be constructed on the lower, or right hand, berm. Excavation is on an offset line, to allow for future development to 100 foot bottom width and 154 feet at water surface, without increase in depth. The two tunnels required by the present development, one 1740 feet long and the other 4124 feet, will be lined with reinforced concrete. They will be 20 feet in the clear. The Gila River siphon will be designed for three reinforced concrete barrels. Only one barrel, 19½ feet in the clear, is to be constructed now.

Headworks for the canal will be at the Arizona end of Imperial Dam. There will be three settling basins about 1200 feet long, with a top width of 227 feet and side slopes of 2 to 1. They will be bordered by compacted embankments, with a 6 inch lining of selected pit run gravel and 8 inches of concrete on that. The transition at the canal head will rest on approximately 1800 sixty foot wooden bearing piles, driven with a Vulcan steam rig. A 33 Bucyrus-Armstrong well drill was used to test the foundation materials under the site by means of a number of 6 and 8 inch holes.

The headworks and canal to station 30 were included in the Imperial Dam contract of Morrison-Utah-Winston Company. The canal is carried between embankments, the lower one compacted, near the head. This work was done by the George W. Condon Company, under subcontract, using a fleet of Euclid Trac-Truks, loaded with a Northwest 2¾ yard Dragline. The 6-inch layers of earth were spread with Baker bulldozers, on Allis-Chalmers tractors,



• The transition from desilting basins to the Gila Valley Canal gravity section will be carried on this piling.

• Construction of two tunnels was part of the work under the Mittry Brothers contract. Headings were drilled from this jumbo, and blasted material was loaded out with a Conway mucker.

sprinkled with an International tank truck and compacted several times with sheepsfoot rollers. 20-foot wooden sheet piling was driven under the lower embankment, which is 30 feet wide on top, with a 2 to 1 slope on both sides. The outside slope is blanketed with rock. The inside slope of the uncompacted upper embankment is 2 to 1 and the outside slope 1½ to 1.

Boyce & Igo Excavate 3,200,000 Yards

Canal schedule No. 1, stations 30 to 85-plus 30, was excavated by Boyce & Igo Construction Company, using a Bucyrus-Monighan 3-T dragline to rough out the channel and a 3-yard Northwest in finishing and in excavating drainage channels. The contract price was $73,200. Excavation consisted of 790,000 yards of common, 15,000 yards of rock (at station 85 plus 30) and 50,000 yards of drainage channels and dikes. The right of way was largely through desert sand, and was cleared of the natural growth of ironwood, paloverde, sahuaro cactus, etc., largely by pushing the trees out of the ground and off the right of way with bulldozer-equipped Caterpillars. These machines also leveled off steep banks ahead of the draglines, leveled the canal bottom and berms and serviced the Monighan. With an Athey crawler wagon behind a "Cat" sixty, 50-gallon drums of fuel oil could be hauled over the loose sand.

The Monighan worked from a position just inside the cut stakes at the lower side of the channel. Most of the dirt was cast on that side because later development will be on the upper side. The rock work on schedule 1 consisted of an open cut near the east portal of tunnel No. 1. It ranged from 15 to 30 feet deep, and was drilled with a Gardner-Denver wagon drill and a Cleveland jackhammer. Holes were spaced 12 to 14 feet and drilled to within 6 feet of grade in the deeper section. Overbreak shattered the bottom enough that additional blasting proved unnecessary.

Atlas explosives were employed. From twelve 1x8 inch sticks of gelatin the first springing, to half a case at the second springing, was used to chamber the holes. They were then loaded with four to six cases of Flo-Dyn bag powder. Up to five tons of explosive was used at a blast. A storm drain was also drilled and blasted in the lower bank of the cut, moving the rock out of the drain with a Hutchins bulldozer on a Caterpillar 75 and a LeTourneau bulldozer on a R D 7. The broken rock from the canal section was removed by Mittry Brothers, of Los Angeles, who had the adjoining tunnel schedules 2 and 3, and used to make an adjacent fill on their job.

Schedule 4, stations 408 to 951, comprising 2,255,000 yards of common, 40,000 yards of rock and 50,000 for drainage and dikes, is also being excavated by Boyce & Igo for a contract price of $200,400. Much of this schedule is tough digging, in addition to the sections of rock near the Gila River. A long section starting near station 408 was through a mass of rocks under a foot in diameter and with little more sand than would fill the crevices. Other sections of cemented rock and gravel were involved, some so hard as to require blasting. The firm's 10-W Bucyrus-Monighan dragline was moved across the river from where it had been parked after finishing on the All-American canal, to bear the brunt of this hard work.

Handling the Tough Spots

Near station 408 the canal turns south, along the base of the mountain range. The 10-W was erected near the middle of schedule 4 and moved to the north end, filling in ravines and making an operating

• Three rocks ridges presented a tough problem on the Boyce & Igo contract. Powder experts are shown here figuring the best way to blast one of the ridges. The Boyce & Igo 10-W dragline is working in the background.

road along the lower side of the cut stakes, then roughed out the channel as it returned.

The largest cut on the schedule was in sand, about 55 feet deep. Scooping out this and other easy digging at a rapid clip the machine moved into the rock ridges and hard ground near the Gila river. This was scraped as clean as possible with the big bucket, then drilled with Gardner-Denver and Cleveland jackhammers and blasted. In the rock ridges 20 and 22 foot steel was used and the holes sprung twice, with from one stick to two pounds the first chambering, and three or four pounds the second. The deepest holes were loaded with as much as a case of Atlas Flo-Dyn, holes 8 to 10 feet deep with a bag to a hole. Some sections of canal 150 feet long were blasted at one time, but as a rule the blasts were comparatively small.

Stripping in Layers

In some areas of cemented gravel north of the river, strata of tough, hard clay had to be uncovered with shallow shots, perhaps 8 to 10 feet deep and spaced about 6 feet, then stripped off before another layer of gravel could be drilled and blasted. As many as three lifts were made in these places. Drills gripped by the clay sometimes had to be pulled with jacks. Leaving the Northwest dragline to finish the channel at this point the 10-W moved on across the river and excavated the canal to the Quartzite highway, near station 829, leaving three granite ridges at the river bank scraped clean for the drill crew. The Monighan 3-T was moved across the river to clean up this rock when blasted.

A four bottom lister plow was used to bond plow areas to be covered with the canal berm. Another innovation was a box-welded steel drag beam which is swung from the boom of the Northwest and used very effectively in smoothing the canal slope. It is so arranged that the bucket is lowered on it to scrape the hardest spots.

Canal and Tunnels by Mittry Brothers

Schedules 2 and 3, stations 85 plus 30 to 408, contracted by Mittry Brothers for $681,500, included 1330 feet of canal from station 85 plus 30 to the east portal of the 1740 foot tunnel, No. 1 and 3600 feet of open channel between No. 1 and No. 2. The open canal was excavated first, including a 600 foot rock cut near the west portal of No. 1 with a maximum depth of 75 feet. This was removed in three lifts, using four Ingersoll-Rand jackhammers to drill the first lift and two wagon drills of the same make and mounted on tractors for mobility, in the main section of the other two lifts.

A Koehring combination shovel, with dragline attachment, was used for all open excavation. Hauling was done with a fleet of 8-yard International dump trucks. The rock from the cut was used in making an adjacent fill. However, most of the spoil from the open canal section between the tunnels was cast direct to the lower embankment. The same methods and equipment were used in blasting and excavating tunnel approaches, with some variation at the west portal of No. 2. No. 1 tunnel was driven first, starting from the west portal. Unstable ground at the portal made it necessary to drive the arch section ahead first and place wall plates and segments of 12x12 for six foot sets, to get under ground. The main section was then blasted from the center until posts could be installed under the wall plates. Frequent strata of crumbly rock were encountered throughout the tunnel, necessitating the use of short timber sets in such areas.

Tunnel No. 2 was in more stable material, some 1500 feet being driven through a pink lime formation, thickly studded with calcite crystals. The remainder of the tunnel, on the west end, was in a

gray cemented gravel. While this gave some trouble by crumbling into the drill holes, good progress was made. 12 foot rounds were pulled as a rule, and little timbering was required.

Underground both tunnels were drilled with six Ingersoll-Rand N-74 drifters on a jumbo. About 50 holes to a round, from 6 to 12 feet deep, according to stability of the rock, were required. They were loaded with Dupont 1¼ by 12 inch gelatin stick powder, of 40 per cent strength in the rock and 30 per cent in the cemented gravel. Firing was done with a Dupont 440-volt machine, using several delays so that the outer holes were broken last, finishing with the top, to prevent shattering the arch.

Muck was loaded with a Conway mucker into side dump Copple cars. A "California switch" was used for transfer at the heading and trips were pulled to the portal with three Mancha electric locomotives and from there to the dump with a Plymouth locomotive.

Aggregate Furnished by George Pollock Co.

Suitable aggregates for concrete work are scarce on the Arizona side of the Colorado, but an excellent deposit was found some 2½ miles from the Gila river siphon site. The George Pollock Company contracted the production of aggregates for all the concrete work on Gila Valley Gravity Canal, including tunnel lining, river siphon and other construction.

A plant, with 150 yard per hour capacity, was moved from the Colorado River Aqueduct. To March 1, this plant had furnished about 331,000 yards of aggregates.

At this writing the Morrison-Utah-Winston Company, general contractors of Imperial Dam, are nearing completion of concrete diversion structures where water will enter the Gila Gravity Canal from the desilting basins. A sluiceway leading back to the river and

• "I knew we were digging this basement too deep!"

"Sir, I have neither pencil nor paper."

"What would you think of a soldier who went to battle without a rifle or ammunition?"

"I would think he was an officer, sir."

headgates to the canal are included.

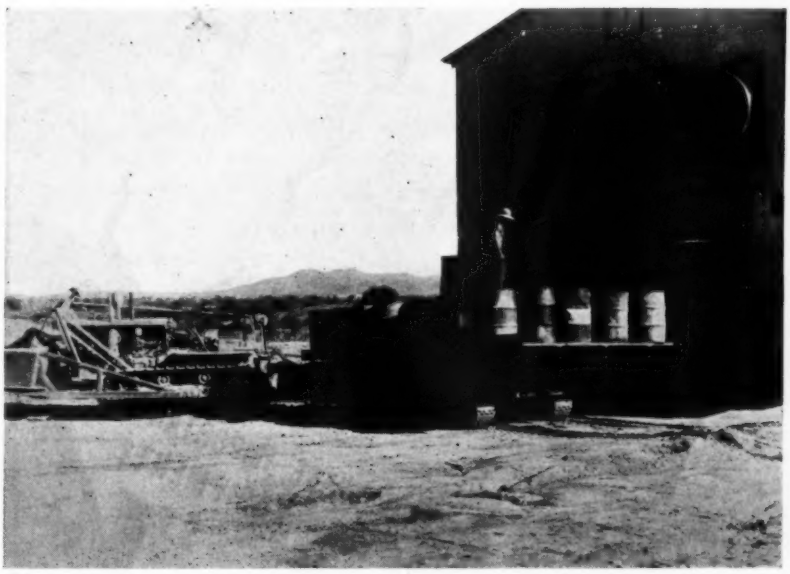
Excavation in the Gila area, for desilting basins which was subcontracted by the George Condon Company is suspended for the time being. The diversion channel of the river running through it while dam construction is in progress. Condon's work on the canal section is finished.

Boyce & Igo Construction Company are nearing completion of their contract, including about 600,000 yards of additional excavation involved in a change of canal location near the lower end. This involved some deeper excavation than the original route, but no hard digging. The big dragline is now excavating near the site of the proposed pumping plant, at the end of the gravity ditch.

Mittry Brothers have finished lining tunnel No. 1, except portals, and have started on lining No. 2. A strip of concrete is poured along the base of each tunnel wall, and movable forms, resting on a jumbo, are then used in concreting the walls and arch by air pressure. The jumbo moves on the base strips. Timbers are left in place where they will clear the lining. The bottom will be poured last.

The Metropolitan Construction Company, of Los Angeles, is now moving in equipment for construction of a siphon to carry the canal across the Gila river. It will be 19 feet 6 inches in diameter (in the clear) and 2120 feet long, of reinforced concrete. 177,000 yards of excavation is involved, and 106,000 yards of compacted embankment. The contract price is $337,375.50.

L. J. Foster is construction engineer in charge of the Yuma office of the United States Bureau Of Reclamation. J. C. Thrailkill is chief clerk and T. A. Clark office engineer. N. Enger is division engineer of the Gila Valley project.



• Fueling the big 10-W is handled as shown here. Drums are carried on a special-bodied Athey wagon, pulled by a Caterpillar 75. The drums are filled from a big storage tank.

ALLIS-CHALMERS

HAVE YOU CHECKED THESE IMPORTANT POINTS AGAINST YOUR EQUIPMENT?

INITIAL COST
WORKING SPEEDS
UPKEEP COST
TIME LOSSES FOR REPAIRS
STARTING TIME
COST OF FUEL PER GALLON
COST OF LUBRICATING OIL
WORKING LIFE
TRADE-IN VALUE

ALL THESE ENTER INTO YOUR FINAL COST PER YARD ... IT WILL BE LOW IF YOU USE ALLIS-CHALMERS EQUIPMENT

HE YOU BUY ... GAIN AS YOU WORK
HE YOU TRADE-IN! ... WITH

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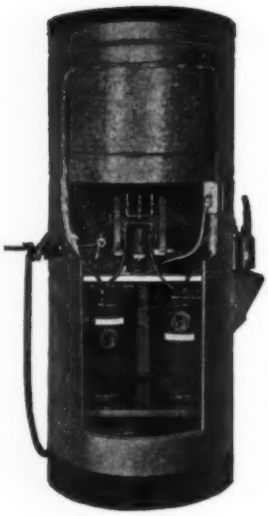
OIL TRACTORS

Equipment you ought to KNOW ABOUT



Oil Reclaimer

A new oil reclaimer just announced by Bucyrus-Erie Company of South Milwaukee, Wisconsin, is claimed to make remarkable savings in lubrication costs plus additional economies in engine maintenance fuel cost.

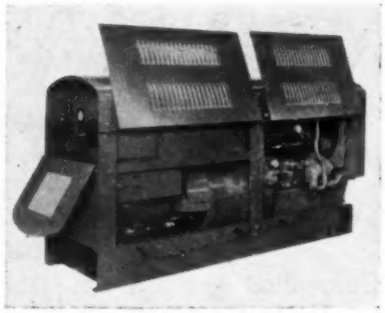
Selling for approximately $300 f.o.b., this Bucyrus Oil Reclaimer departs from the complicated distilling processes generally used previously in this type of equipment, with a resulting simplicity and low cost of operation that, together with the low first cost, make oil reclamation really economical for any owner of trucks, tractors or other gasoline or Diesel engines. Transformer oil, heat-treating oil, and other fluid industrial oils can also be successfully reclaimed with this unit, according to Bucyrus-Erie.

Recovery of up to 90% of average crank-case oil is claimed with an overall cost of about 9 cents per gallon. The quality of the oil is claimed to be even better than that of the new oil originally put into the engine because the weaker and unstable parts of the oil have been broken down by heat and friction in the engine, and the wastes such as carbon, waxes, tars, resins and acids, plus the accumulated grit and dirt are completely removed by the washing and filtering process used in this new type reclaimer.

Hence, in re-use of this reclaimed oil, there is progressively less and less deterioration because only the portion of the oil is reused that stands up after stabilization in the engine. An illustrated bulletin will gladly be sent by Bucyrus-Erie Company to any of our readers who are interested.

Diesel Engine Driven Arc Welder

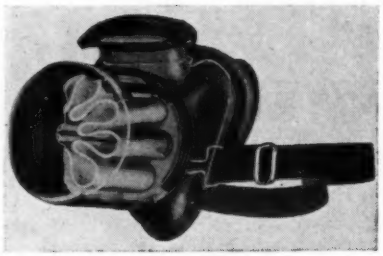
A new Diesel engine has been adopted for driving arc welding generators by The Lincoln Electric Company, Cleveland, Ohio, in collaboration with Diesel engine manufacturers.



The Diesel driven welder, by accelerating turbulence of the fuel and air mixture, affords more complete combustion, increased efficiency, and a minimum of smoke and noise, according to the manufacturer.

Priming Pump

An automatic priming pump, built of aluminum alloy and weighing only 52 lbs., is being offered by The Jaeger Machine Company, Columbus, Ohio. Its rated capacity of 5,200 gallons per hour is said to be the largest ever developed by a pump of this light weight. The priming action, employing the Jaeger patented Priming Jet, insures fast self-priming at lifts up to 25 ft., it is claimed. Including standard ¾-1 h.p. ball bearing engine with carburetor and large gasoline tank of .4 gallon capacity, the Bantam measures 9½"x19".

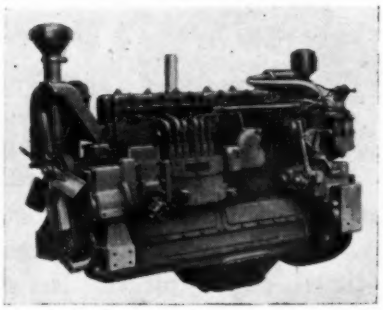


Respirator

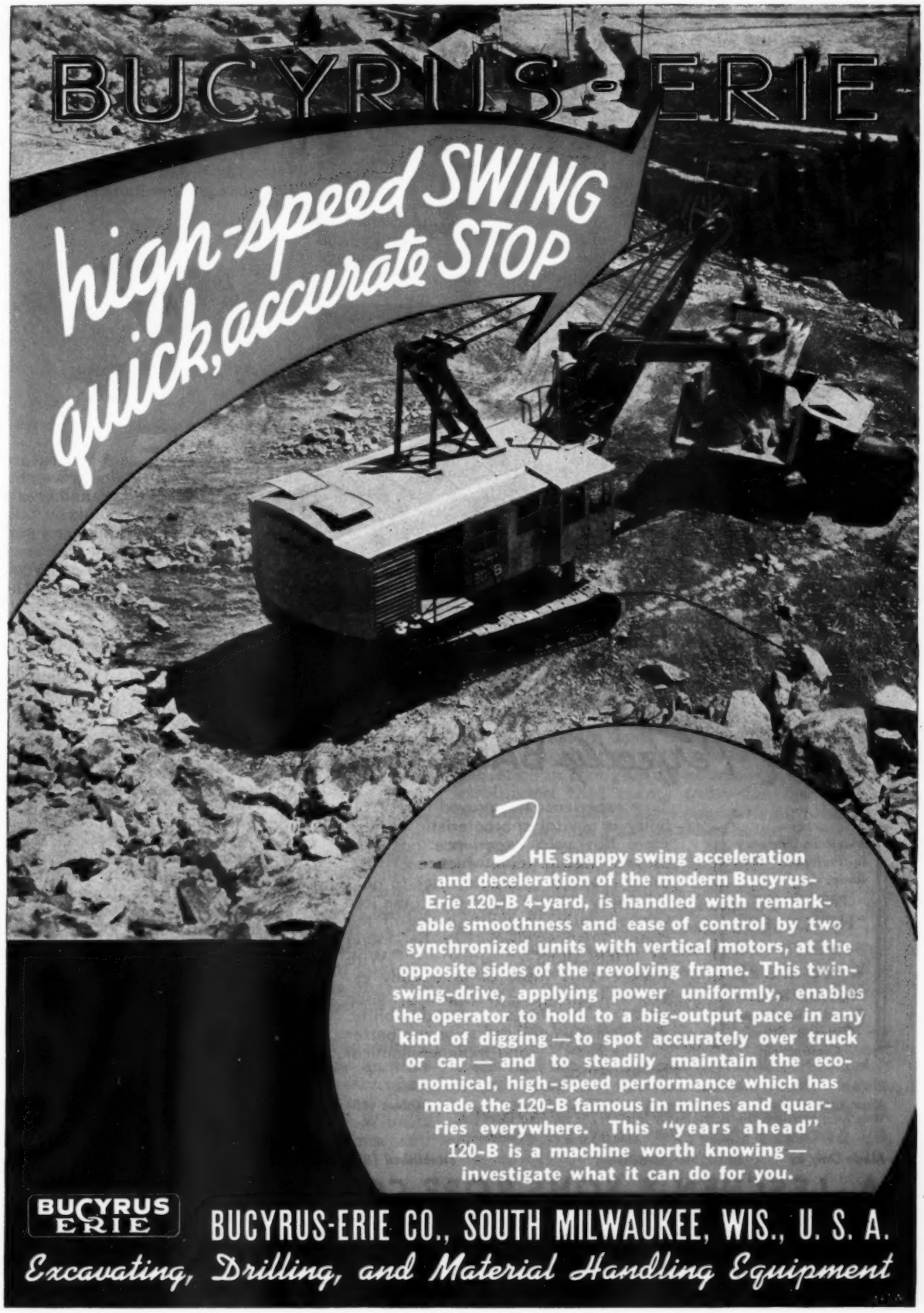
The Willson Rotiform Respirator, approved by the United States Bureau of Mines, for protection against Type "A" dusts such as silica, quartz, asbestos, aluminum, iron ores, etc., produced in the process of grinding, mining, quarrying; and in industrial operations of grinding, crushing and general processing of materials. For further information, write to Willson Products, Inc., Reading, Pa.

Diesel Engine

Adding to its line of industrial Diesel engines Caterpillar Tractor Company has announced a new, six-cylinder, 66-horsepower model, designed at the D4600.



The engine has a bore and stroke of 4¼"x5½", and turns at 1,400 RPM, normal governed speed. The model is suited for use in shovels, draglines and hoists, or connected to a generator as an electric power producer. In construction work, the new engine will power ¾ yard shovels and draglines. As a source of electric current, it will be offered as a unit with a 35KW generator at 50 cycles at 1,500 RPM; or as a 32½ KW generator at 60 cycles at 1,200 RPM.



THE snappy swing acceleration and deceleration of the modern Bucyrus-Erie 120-B 4-yard, is handled with remarkable smoothness and ease of control by two synchronized units with vertical motors, at the opposite sides of the revolving frame. This twin-swing-drive, applying power uniformly, enables the operator to hold to a big-output pace in any kind of digging — to spot accurately over truck or car — and to steadily maintain the economical, high-speed performance which has made the 120-B famous in mines and quarries everywhere. This "years ahead" 120-B is a machine worth knowing — investigate what it can do for you.

BUCYRUS ERIE

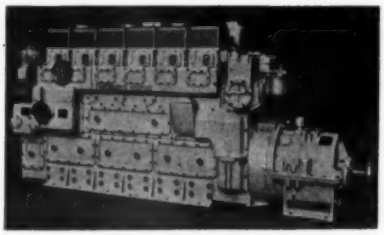
BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WIS., U. S. A.

Excavating, Drilling, and Material Handling Equipment

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Convertible Gas and Diesel Engine

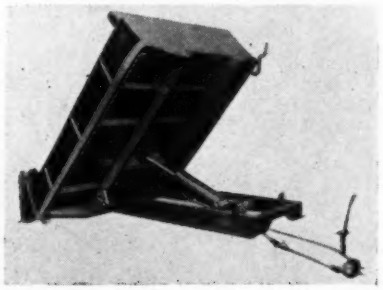
Fairbanks, Morse & Company, Chicago, Illinois, has announced a series of four-cycle, vertical, convertible Diesel and gas engines. This new Model 36-A-8 is built in both six- and eight-cylinder combinations. With 8-inch bore and 10½-inch stroke, it develops 35 h.p. per cylinder at 720 r.p.m. Smaller sizes of Model 36-A Diesel are available in ratings as low as 8 h.p.



Both Diesel and gas engines in the new 8-inch cylinder size are offered for stationary service, and the Diesels are offered for marine propulsion.

New Hoists and Dump Bodies

Gar Wood Industries, Inc., Detroit, has announced the introduction of a re-designed line of hoists and dump bodies for 1½- and 2-ton truck chassis—both short and long wheelbase—together with, it is claimed, an improved line of heavy-duty dump-bodies, hydraulic hoists and mechanical hoists.



The units are said to feature greater strength, reduced weight, lower mounting height, and greater dumping angle. Box-type tailgate construction and stronger, lighter body trunnion are features of this tested line of Gar Wood dump bodies according to the manufacturer.

Road Paver

The Foote Company, Inc., of Nunda, New York, builders of road pavers, announces a change in their Adnun Black Top Paver. Manual controls are screed, the power cut-off, and end gates have been replaced by hydraulic controls. The power cut-off gate at the bottom of the hopper is now divided into four sections, each section independently and hydraulically controlled by a small lever on the operating platform.

Truck Mixer

Ransome Concrete Machinery Company announce a new line of truck mixers in 5 sizes, 1, 1½, 2, 3 and 4-yard capacities. Some of the important features of these mixers are: a swivel discharge chute having a 180 degree swing and furnished in two sections, a siphon outlet from the main supply tank which measures the exact amount of water discharge even though the truck may not be level, the motor, transmission, reduction gears, etc., all protected against dust, materials and exposure to elements, and drum rollers with supports which take all end thrust loads and transmit them directly to the frame.

For Maximum Efficiency in *Preformed* Wire Rope, Use . . .
PREFORMED
"HERCULES"
(Red-Strand)
WIRE ROPE
Available in Both Round Strand and Flattened Strand Constructions

Your experience has proved that flexibility is a vital characteristic of wire rope. But your experience has also proved that a rope which sacrifices other essential characteristics to gain flexibility will not stand up on the job. Consequently, flexibility is one of the characteristics always to be found in "HERCULES" (Red-Strand) Wire Rope — plus these other equally essential features — strength . . . elasticity . . . toughness . . . and durability. All perfectly balanced to assure better . . . longer . . . and more economical performance.

Your first trial will convince you that "HERCULES" (Red-Strand) solves your wire rope problem the economical way. Try it on your next job.

Made Only by *Established 1857*

A. LESCHEN & SONS ROPE CO.

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New York . . . 87 to 90 West St.
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San Francisco . . . . . 520 4th St.
Seattle . . . 2244 First Ave., South

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

A-W TRAIL CARS IN UNITED ELECTRIC'S BUCKHEART MINE

"move an Average of 55 Tons per trip"

...SAYS VICE PRESIDENT
M. M. MOSER

● "In selecting the haulage equipment for this mine," Mr. Moser continues, "the one fundamental factor in cost of transportation was: *the larger the load hauled per trip the lower the unit cost* . . . provided, of course, that the large capacity load could be handled with consistency.

"The top of the dump hopper at this mine is on practically the same level as the coal seam. Therefore, no serious grades are encountered. Under these hauling conditions the Austin-Western Tandem Dump Trailers easily handle the largest load that has been successfully pulled to date by a single truck tractor. During a 30-day period these tandem units averaged 27½ tons per trail car . . . or 55 tons of raw coal per trip. Results realized so far indicate that the haulage operation is entirely satisfactory and economical."

The success of these giant automotive units—the largest trail cars ever built—adds another outstanding achievement to the impressive performance record of Austin-Western Trail Cars. It demonstrates why there are more A-W units used in open pit coal mines today than any other make of semi-trailer.

Austin-Western Trail Car performance reflects the practical value of "Western" Dump Car experience in designing pneumatic-tired hauling equipment that meets individual production problems . . . that is low in operating and upkeep costs. They are built to take the terrific impact of big shovel loading . . . the hammering jolts of travel over rough mine roads.

An important factor in this time- and money-saving performance is the distinctive A-W Air Operation of clamshell doors from the cab, enabling the driver to dump each load separately at the desired location. And full door clearance makes it possible to handle gob on return trips for low cost road maintenance.

Use the broad experience and proved ability of Austin-Western engineers to develop haulage units that assure "satisfactory and economical" handling of your special haulage requirements.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
Formerly **WESTERN WHEELED SCRAPER CO.**
AURORA, ILLINOIS

Austin-Western

For your convenience in writing to Austin-Western Road Machinery Co., you will find a card bound in this issue.

Shots from the FIRING LINE

Dredging Season Begins at Fort Peck

Two of the four, 5000-h.p., all-electric, suction-type dredges, being used by the Army Engineers in construction of Fort Peck dam, have started operation. Dredge Madison opened the 1938 season at 4:20 p.m., March 3, with three boosters, two 2500-h.p. land boosters, and one 5000-h.p. floating booster coupled into her 18,550 feet of 28-inch pipe line. Dredge Gallatin, aided by one 5000-h.p. floating booster and one 2500-h.p. land booster, started pumping the afternoon of March 6. All fill material pumped this season has gone into the section of the upstream toe now known as the upstream berm.

Excavation at the spillway is again underway with the B & M Construction Co., subcontractors on the Addison-Miller contract, moving 1000 cu. yds. per day from the unlined approach channel to the gate structure. A power shovel and an elevating grader are being used for loading trucks, but because of muddy roads, over which the material must be hauled, yardage attained is still below expectations.

Bids were opened at 11:00 a.m. on December 3, 1937, for the last of the major construction contracts on Fort Peck Dam. This contract, let by the offices of the Division Engineer at Kansas City, Mo., is for furnishing all labor and materials (except sand, gravel, and cement) for completing concrete and steel work in main shafts and their foundations, installing main control gates and machinery, and building a concrete building over each shaft. The low bidder, Fegles Construction Company Limited, 711 Wesley Temple Building, Minneapolis, Minnesota, offered a bid of $1,876,922.21 which was accepted. The new contractor was given notice to proceed with the work on December 16, 1937.

Two office buildings have been erected at the site; one for the field representatives of the Army Engineers and one for the contractor. Another building to be used as a machine and carpenter shop is being constructed. When this building is completed, there will be little or no activity at the site, except making measurements and shop drawings, until the first shipment of steel arrives probably late in May.

Wunderlich Awarded Vallecito Dam

The Martin Wunderlich Company of Jefferson City, Missouri, on its bid of $2,115,870, was awarded contract for construction of Vallecito Dam, the major engineering feature of the new Pine River Federal Reclamation project.

Vallecito Dam will be an earth structure, rising about 125 feet, which will stretch approximately 4,000 feet across the Pine River above Bayfield, Colorado.

The dam will create a reservoir of 126,000 acre-feet capacity for the irrigation of 69,000 acres of white and Indian lands down stream. Of the total acreage to be served, approximately 35,000 are now receiving water through canals already constructed. The supply of this area will be supplemented. About 19,000 acres of the land involved belong to Indians.

The successful bid was the lowest of nine proposals received and opened by the Bureau of Reclamation at its Durango, Colorado, office. While the contract will be awarded, notice to the contractor to proceed with the work will be withheld temporarily, pending approval as to form of the repayment contract with the Pine River Irrigation District and a memorandum of understanding between the Bureau of Indian Affairs and the Bureau of Reclamation. The contractor will be expected to begin work within thirty days after receipt of notice to proceed and must complete construction of the dam in 1,350 calendar days.

Vallecito Dam will have a reinforced concrete outlet conduit constructed in

• The 33rd Annual Banquet of the Chicago Contractors Association was a big success, judging from the turnout shown in this picture, as well as the smiles of the banqueters. The Morrison Hotel was the locale, February 24, the date.

MAN-SIZE LOADS

RIDE FOR "HALF-FARE"!

Here's an example of close harmony between two "Caterpillar" Diesel Units — and the result is an earth-moving job done for almost a song!

The Bucyrus-Erie 48-B shovel is powered with a "Caterpillar" Diesel Engine. The tractor is a "Caterpillar" Diesel D7. Both have been built to make sparing use of the least expensive of fuels . . . and to take hour after hour of punishing work without a sign of "cracking"!

But it's not only the minimum outlay of actual cash for repairs and fuel that enables "Caterpillar" Diesel Power to move man-size loads at "half-fare"! Consider the saving of time through steady, constant loading with a dependable engine in the shovel . . . through quick spotting because of the tractor's maneuverability . . . through plenty of power and traction to walk the loaded wagon over bad going, and quickly return it to the cut!

Work like that — from two machines of the same family — keeps you free from slow, profit-wasting moments. No wonder word is going around that *"savings add up fast, when everything is 'Caterpillar' Diesel!"*

CATERPILLAR TRACTOR CO.
REG. U.S. PAT. OFF.
PEORIA, ILL.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

● Can you trace the "maze" of highway through valleys and over and around mountains? This air view shows Coldwater Canyon and San Fernando Valley, home of many famous movie stars.

an open cut at the right abutment and a concrete-lined open channel spillway at the same abutment. The outlet conduit will be 610 feet long and will open into the spillway channel, which will be approximately 2,330 feet long, including the stilling basin at the down-stream end. The discharge over the spillway will be controlled by three radial gates, each 37 feet long and 19 feet high.

A.E.D. Holds Successful Winter Meeting

The Nineteenth Annual Convention of the Associated Equipment Distributors, Cleveland, Ohio, was marked as the biggest convention ever, both in attendance and accomplishment.

After the formal opening of the first session, the new active members (distributors) were introduced, welcomed, and became a part of the discussion of addresses and topics on the program. Received with special interest was the report on the Robinson-Patman test case given by C. G. Brochert, St. Paul, Minnesota.

Interesting events of the second session included a contractor, Sam Pace, General Asphalt Co., Canton, Ohio, being put "on the spot" with the subject, "What a Contractor Has a Right to Expect From a Distributor." (Perhaps Mr. Pace wasn't on the "spot" as he may have got a few pet grievances off his chest.) Other discussions in this session delt with the varied phases of the relationship between Manufacturer, Distributor, and Customer (both private corporations and governmental agencies).

The officers elected for the ensuing year are as follows: A. F. Sersanous, president; Victor L. Phillips, 1st vice president; R. R. Nixon, Chattanooga, Tenn., 2nd vice president; A. C. Blaisdell, Cincinnati, Ohio, secretary and treasurer; E. S. Jenison, San Francisco, Calif.; E. P. Phillips, Richmond, Va.; M. R. Hunter, Milwaukee, Wis.; E. K. Hurst, Sioux Falls, S. D.; and G. F. Lowe, Chicago, Ill., directors.

S.F. Fair Awards New Road Contract

Contract for the final Yerba Buena Island unit of the 1939 Golden Gate International Exposition's $600,000 highway has been awarded by the War Department, which is handling this phase of the work according to W. P. Day, vice-president and director of works of the Exposition. Bidding as one firm on this contract, Heafey-Moore Company and Frederick & Watson Construction Company of Oakland won the award with a bid of $228,368.50.

This unit begins at a point south of the Treasure Island causeway on Yerba Buena Island and extends to the San Francisco-Oakland Bay Bridge. Included in this unit are three roads from the bridge and a fourth which ties into the overpass at the west portal of the Yerba Buena Island tunnel.

One road, for truck service, will lead to the lower deck of the bridge. A second road, leading to the upper deck of the bridge, will handle returning San Francisco automobile traffic. A third road will branch from the upper deck of the bridge at the west portal of the

More "RPM" Diesel Engine Lubricating Oil is being sold and used in "Caterpillar" Diesel Engines than all other Diesel oils combined

STANDARD OIL COMPANY OF CALIFORNIA

"RPM" Diesel Engine Lubricating Oil is distributed by the following companies under the brand names indicated:

IN THE UNITED STATES

"RPM" Diesel Engine Lubricating Oil:
THE CALIFORNIA COMPANY (Montana only)
THE CARTER OIL COMPANY, Tulsa, Oklahoma
HUMBLE OIL & REFINING COMPANY
STANDARD OIL COMPANY (Indiana)
STANDARD OIL COMPANY (Incorporated in Kentucky)
STANDARD OIL COMPANY (Nebraska)
STANDARD OIL COMPANY OF CALIFORNIA
STANDARD OIL COMPANY OF TEXAS
UTAH OIL REFINING COMPANY

Diol "RPM" Diesel Engine Lubricating Oil:
COLONIAL BEACON OIL COMPANY, INC.
STANDARD OIL COMPANY OF LOUISIANA
STANDARD OIL COMPANY OF NEW JERSEY
STANDARD OIL COMPANY OF PENNSYLVANIA

Signal "RPM" Diesel Engine Lubricating Oil:
SIGNAL OIL COMPANY

Sohio "RPM" Diesel Engine Lubricating Oil:
THE STANDARD OIL COMPANY (Ohio)

IN CANADA

"RPM" Diesel Engine Lubricating Oil:
IMPERIAL OIL LIMITED
STANDARD OIL COMPANY OF BRITISH COLUMBIA LIMITED

THROUGHOUT THE WORLD

"RPM" Diesel Engine Lubricating Oil is also available through distributors in more than 100 other countries.

RPM
TRADE MARK REGISTERED
DIESEL ENGINE LUBRICATING OIL

LOOK FOR THIS NAME

The "RPM" trade-mark appears on every container of genuine "RPM" Diesel Engine Lubricating Oil. It is your assurance of superior lubrication.

Approved by CATERPILLAR TRACTOR CO.

For your convenience in writing to Standard Oil Co. of California, you will find a card bound in this issue.

● On a road job near famed Gettysburg, Nello Teer uses this hydraulic-dump, Euclid TracTruk. Tracks in foreground give an idea of the traction provided by the Goodyear tires.

tunnel for East Bay incoming traffic. The fourth road, which will carry incoming traffic from San Francisco and outgoing traffic to East Bay points, joins a connecting road, built under another contract, at the west portal overpass. These roads merge into a six-lane highway as they drop away from the bridge toward the Exposition site.

Additional Yakima Canal Award

T. E. Connolly, Inc., San Francisco, California, on his bid of $316,142.40, has been awarded the contract for excavation of an additional section of the Yakima Ridge Canal and construction of tunnel No. 5 for the main canal of the Roza Division of the Yakima project.

The successful bid was the lowest of three proposals opened by the Bureau of Reclamation in its Yakima, Washington, office. The contract covers excavation of three miles of canal and the drilling of a horse-shoe shaped tunnel 13'9" in diameter and 3,904 feet long.

It is estimated that about 52,200 cubic yards of earth must be removed in excavating the canal and about 29,860 cubic yards of earth and rock in boring the tunnel.

The contractor must begin work within 30 days after receipt of notice to proceed and is allowed 400 calendar days to complete the contract.

Mississippi Group Joins ARBA

The Mississippi Highway Contractors' Association, Inc., has voted affiliation with the American Road Builders' Association. Decision to join forces with the A.R.B.A. was prompted by a desire to aid more forcefully in the campaign to build safety into the highways of the nation and to work concertedly and more effectively for the continuation of an adequate highway program. M. G. Cobb of Cobb Bros. Construction Co., Meridian is president of this group. Other officers include S. B. Ziegler of Ziegler Construction Co., Nashville, Tenn., vice-president; Ellis A. Hoffpauir of Dunn Construction Co., Montgomery, Ala., and Jackson, Miss., secretary-treasurer, and R. N. Kinnaird, Jackson, Miss., executive secretary. The directors, in addition to these officers, are Frank A. Barber, of Barber Bros. Construction Co., Baton Rouge, La.; John M. Harbert of Harbert-Cargile Construction Co., Birmingham, Ala.; C. F. Shuptrine of Shuptrine Construction Co., Natchez, Miss.; Wade E. Moore of Forcum-James Construction Co., Dyersburg, Tenn., and Alex J. White of West Construction Co. of Tennessee, Louisville, Miss. The new affiliate has a membership of seventy.

New Jersey Governor Opposes Diversion

Financing of the relief appropriations of New Jersey through the tapping of the road funds must stop, Harry A. Moore, newly elected governor, asserted in a recent address before the State Agriculture Convention. Not only must the state desist from the practice of robbing Paul, the motorist, to pay Peter, the relief client, but the change must be effected "without new taxes," said the governor.

Since 1930 New Jersey has diverted to non-highway purposes approximately $80,000,000 of road funds. More than half of the diversion came from bonds authorized by a popular vote in 1930 for the express purpose of building roads. The amortization charges are being met from gasoline taxes paid by motorists. The balance of the diversion was taken from current automotive tax revenue.

WPA Summarizes Accomplishments

Accomplishments of the Works Progress Administration during approximately two years of operation are summarized in a report recently made public by Acting Administrator Aubrey Williams. Individual reports from more then 150,000 projects throughout the United States were tabulated by major

"Wear INSURANCE"
is sold with Every Owen Bucket

Efficient operation is of first importance in a bucket, but long service with freedom from repairs is equally essential.

In many important details, Owen design is conducive to this long, satisfactory operation.

Read, in the new catalog about protected sheaves, sealed shaft bearings, one-piece non-wobbling head, non-chafing cables, etc.

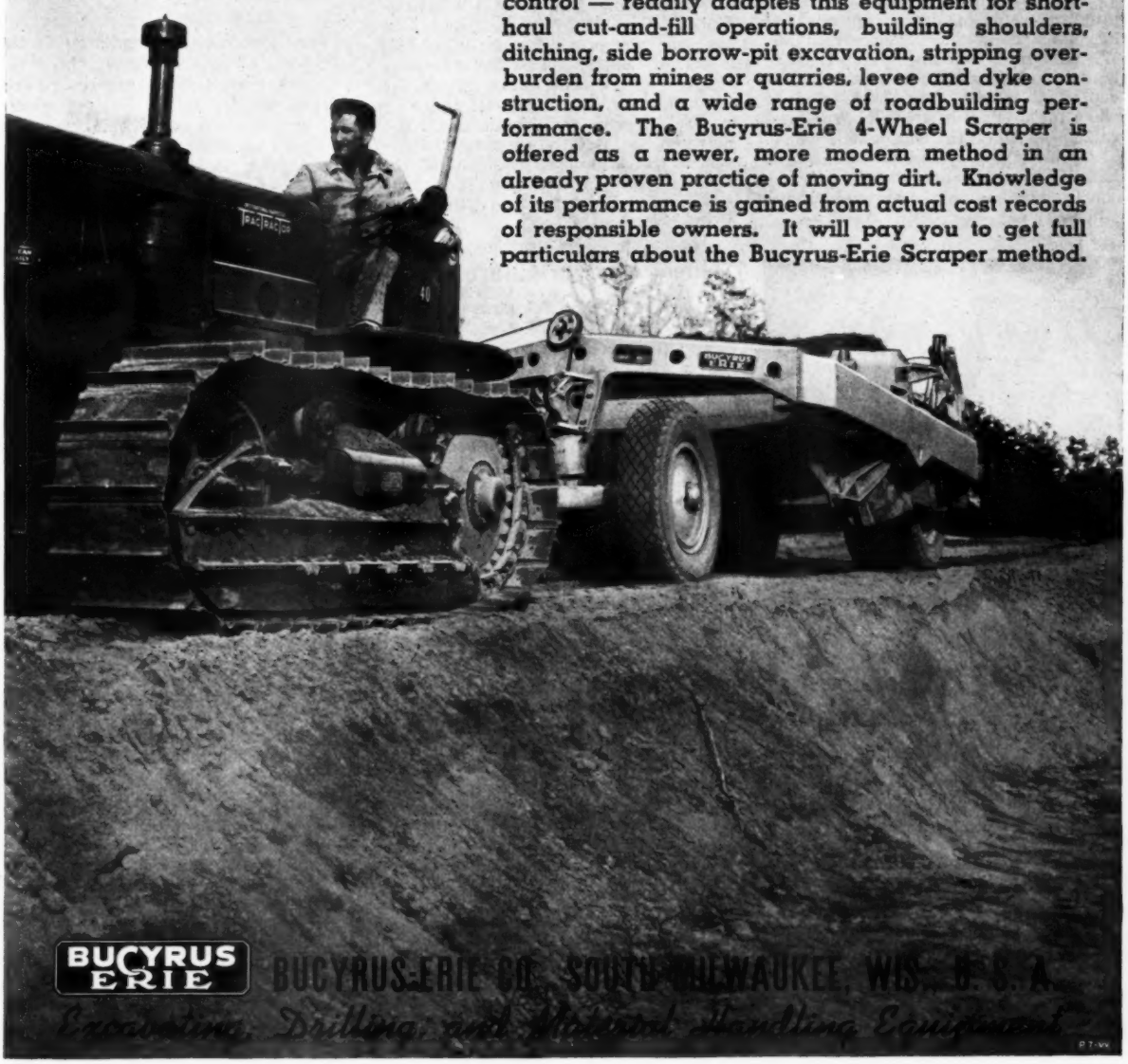
The OWEN BUCKET Co.
6095 Breakwater Avenue, Cleveland, Ohio
Branches: NEW YORK PHILADELPHIA CHICAGO BERKELEY CAL.

For your convenience in writing to The Owen Bucket Co., you will find a card bound in this issue.

BUCYRUS-ERIE

Greater FLEXIBILITY *in Scraper work*

The versatility of the Bucyrus-Erie 4-Wheel Scraper —its easy maneuverability and accurate response to control — readily adapts this equipment for short-haul cut-and-fill operations, building shoulders, ditching, side borrow-pit excavation, stripping overburden from mines or quarries, levee and dyke construction, and a wide range of roadbuilding performance. The Bucyrus-Erie 4-Wheel Scraper is offered as a newer, more modern method in an already proven practice of moving dirt. Knowledge of its performance is gained from actual cost records of responsible owners. It will pay you to get full particulars about the Bucyrus-Erie Scraper method.



BUCYRUS ERIE

BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WIS., U. S. A.

Excavating, Drilling, and Material Handling Equipment

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

types of activity to show the amount of work completed by October 1, 1937.

Outstanding features of the national summary are the construction of:

11,106 public buildings, with repairs and improvements on 30,542 and additions to 1,172.

43,870 miles of highways, roads and streets, with repairs and improvements covering 146,901 miles.

19,272 new bridges and 13,166 repaired.

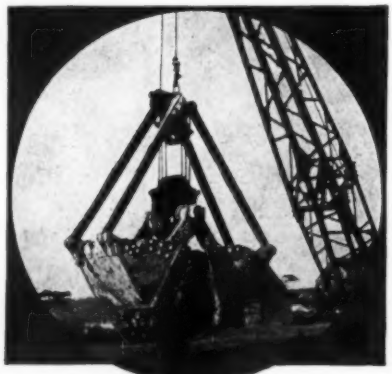
60,846,092 linear feet, or more than 11,500 miles, of roadside drainage ditches, with 167,756,154 linear feet, or approximately 31,772 miles, repaired.

3,865 miles of water mains, aqueducts or distribution lines, with 1,382 miles repaired.

3,300 storage dams, with 283 repaired or improved, 15,855 other dams for erosion control and general conservation, with 145 of this type repaired.

5,692 miles of storm and sanitary sewers, with 1,624 miles improved.

"Any attempt to evaluate such a program would involve an appraisal of benefits to the workers themselves," Mr. Williams said, "but in enabling them to maintain their skills and morale as independent citizens, we have tried to make the product of their labor as useful as possible to the Nation as a whole. The present survey to analyze only the lasting improvements that will be shared by communities throughout the United States."



Hi-power ...the Bucket for Excavating

Contractors say "It's the best bucket we've ever used" . . . because it digs deep, fills full and stands up! It will dig BIGGER PAY LOADS for you. *Ask for Bulletin 237.*

WRITE WIRE OR TELEPHONE
HAISS

George Haiss Mfg. Co., Inc., 144th St. & Park Ave., New York
Who, for over 40 years, have created and sold none but equipment of demonstrable superiority in design and manufacture.
Bucket Loaders — Portable Conveyors

• J. Rutledge Hill, Vice-President of Gifford Hill & Co., Dallas, Texas, and newly elected President of the National Sand & Gravel Association.

Sand & Gravel Officers

With an attendance of about 500 members, the recent combined convention of the National Sand & Gravel Association and the National Ready-Mixed Concrete Association was the largest on record. Concluding a successful program and machinery exhibit, the following officers were elected for 1938.

J. Rutledge Hill, President; Paul P. Bird, Vice-President; and H. S. Davison, Secretary-Treasurer. Elected to the Executive Committee were Chas. M. Cadman, M. A. Neville, George W. Renwick, and J. M. Settle.

President Hill has a long record of service in the sand and gravel and contracting. His earliest connection with the field was in highway engineering. From 1921 to 1926, he was a partner in the contracting firm of Hill-Wilson & Watson. From 1926 to the present he has been vice-president of Gifford-Hill & Co., of Dallas, Texas. He served as member of the code authority for the crushed stone, sand, gravel, and slag industries, and was regional NRA chairman for Texas, Louisiana and Arkansas. He is a past president of the Texas Crushed Stone, Sand & Gravel Association, and a past director of the Texas branch of A.G.C.

Novel Use for Churn Drill

A unique method for putting a ventilating shaft from 450- to 500-foot levels was recently used at the Bonne Terre, Missouri, mine of the St. Joseph Lead Company. The 450-foot level, with a roof 35 feet high in places, had been worked out, and operations shifted to the lower tunnel. There, oil furnaces used in jackhammer bit-sharpening produced smoke and fumes necessitating special provision for ventilation.

Since the 450-foot level was high enough to permit raising a derrick, it was decided to sink a 10-inch ventilating shaft with a churn-type drill. Lattie Goggins, Missouri water-well driller, was called in to handle the job with his Bucyrus-Armstrong 21-W drill. He first removed the derrick and wheel mounting from the rig, then roped it under the cage and lowered it to the 450-foot level. Mounted on wooden sled runners, it was hauled on an underground flat car to the shaft location. The drill's gasoline engine was temporarily replaced by an electric motor, and the derrick was put up. A 10-inch rock bit was used, and the 50-foot shaft put down in 28 hours drilling time, through very hard limestone.

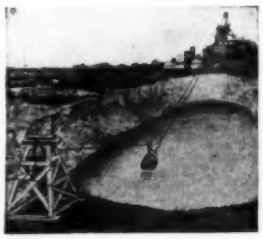
Bureau of Reclamation Exhibits

Graphic representation of some of the world's most spectacular engineering feats, coupled with vivid portrayal

of what government cooperation in the irrigation of arid lands of the West has meant not only to American agriculture, but to the nation as a whole, will be presented to the public for the first time by exhibits of the Bureau of Reclamation in the Museum of the United States Department of the Interior, 19th and C Streets, N.W.

A realistic model of Boulder Dam, in the Colorado River basin, highest in the

SAUERMAN
LONG RANGE MACHINES



FIRST cost of a Sauerman Slackline or Drag Scraper machine adapted to the average long range job, is less than that of other equipment capable of digging, hauling and placing an equal yardage. Operating and maintenance expense is low, too.

If you have any work in view that requires moving materials any distance from 100 to 1500 ft., you can get some money-saving ideas from the Sauerman catalog.

SAUERMAN BROS.
474 So. Clinton St., Chicago

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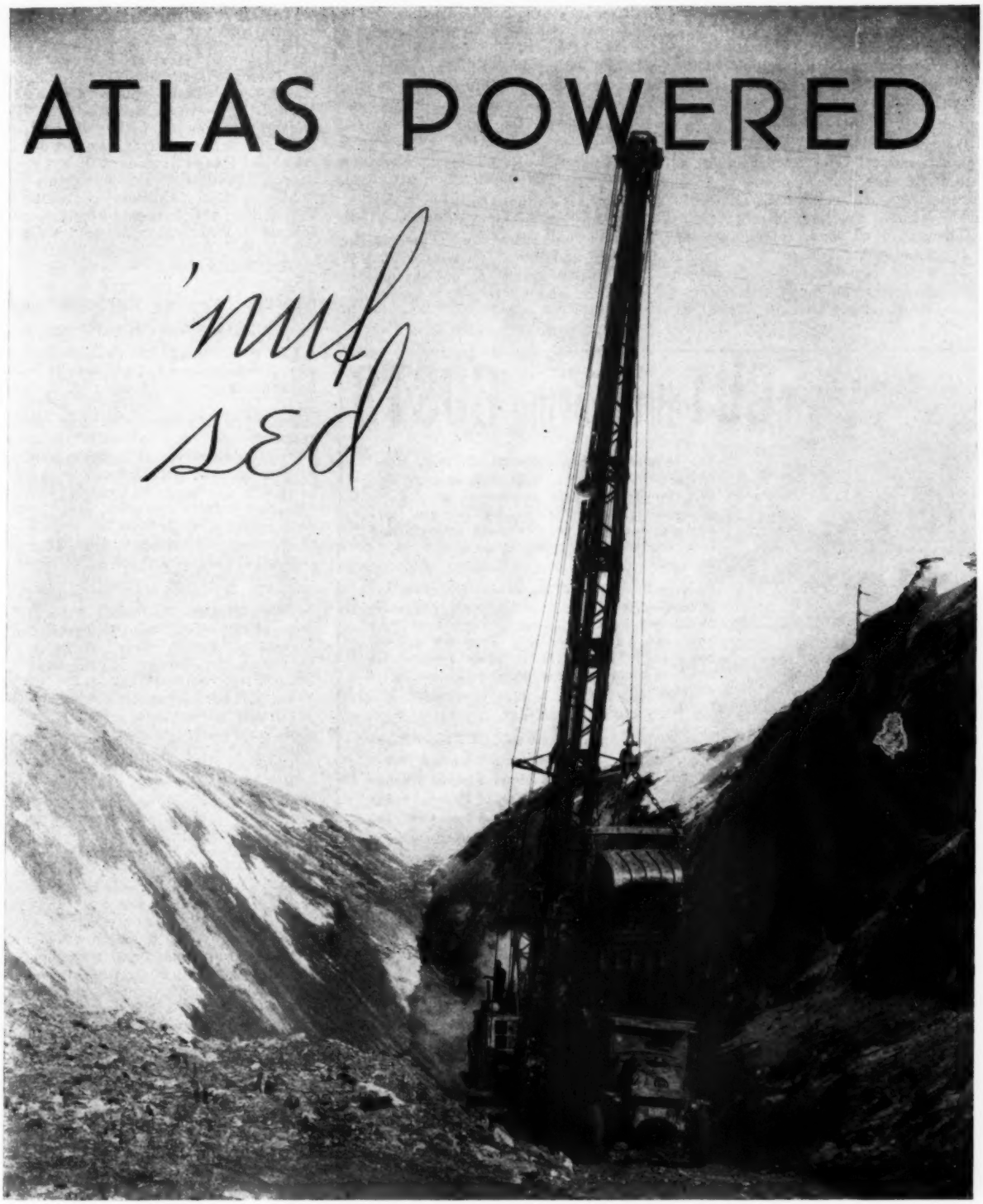


ATLAS IMPERIAL DIESEL ENGINE CO.

Oakland, California Mattoon, Illinois

ATLAS IMPERIAL

For your convenience in writing to Atlas Imperial Diesel Engine Co., you will find a card bound in this issue.

world, with its 726.4 feet towering nearly 200 feet above the Washington Monument, constitutes the most striking feature in the Bureau's exhibit in the Museum on the first floor of the Department building.

Near by, picturization of the Grand Coulee Dam, in the Columbia River basin territory, which upon completion will be the most massive masonry structure in the world, containing 11,250,000 cubic yards of concrete, affords visitors another view of the spectacular work being done by the Bureau in reclaiming arid waste lands for beneficial use through irrigation and hydroelectric power development.

The story of progress in this important conservation work since 1902 is related to the visitor through a series of interesting colored transparencies, ranging from a picturization of the Roosevelt dam, in the Salt River area near Phoenix, Arizona, one of the earliest projects undertaken, to clear-cut descriptions of engineering problems solved in other construction activities.

Another striking feature of the exhibit is a large map, upon which is portrayed by miniature cut-out models, the location and types of dams erected by the Bureau in carrying out the nations irrigation and hydroelectric power development program.

CUT dirt-moving COSTS

The famous big-capacity, welded, alloy steel, Speed-type, Mine-type and Stripper-type dippers for Bucyrus-Erie excavators give extra yardage because of their quick-filling and fast-dumping features. They combine strength and long life with light weight. Capacities 3/8 to 33 yards.

Bucyrus-Erie RED ARCH dragline buckets are streamlined for speed — they give you more passes per hour and more dirt per pass than any other bucket available. They fill quickly, carry easily, dump freely. Three types — for light, medium or heavy digging — sizes 3/8 to 14 yards.

Inserted BECO Tiger Teeth are used on all modern Bucyrus-Erie dippers and dragline buckets. These strong, tough teeth, of forged tool steel, can be reversed, resharpened or easily and quickly replaced.

TOP: Speed type welded dipper.

CENTER: "AX" dragline bucket for medium digging.

BOTTOM: Mine and quarry type welded dipper.

Write for complete information on Bucyrus-Erie dippers and buckets.

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

Excavating, Drilling and Material-Handling Equipment - - South Milwaukee, Wis.

T6-F

Heads Thompson-Starrett

H. B. Hackett, former assistant PWA administrator, became president of Thompson-Starrett Co., Inc., on March 1. L. J. Fisher was elected chairman of the board at the same time. He has been taking an active interest in the construction of Grand Coulee Dam.

Colonel Hackett comes to Thompson-Starrett from the vice-presidency of Coath & Goss, Chicago contractors. Previous to his three-and-a-half years' service in Washington, he was a partner in the Chicago architectural firm of Holabird & Root.

Motor Vehicles Performance to Be Studied

The performance of various classes of motor vehicles on the highways is to be studied by the Bureau of Public Roads in connection with the country-wide highway planning surveys being conducted in cooperation with State highway departments. Separate studies are to be made of highway capacity, vehicle performance on grades, passing distance, vehicle behavior, and driver performance.

The ease with which vehicles move on roads that vary in width, alignment, and traffic volume, will be studied to determine how highways must be designed to better accommodate traffic. A study is now being completed by the Illinois highway planning survey in cooperation with the Bureau. It will analyze 100,000 separate observations.

Vehicle performance on grades, the maximum performance of new trucks and the average performance of random trucks on the highways under various loadings and on various grades will be compared. But laboratory and field tests will be made on the test trucks. This study will continue work carried on during the summer of 1937 in cooperation with the Maryland highway planning survey.

In passing-distance studies vehicles will be observed at the full range of speeds and sight distances on straight sections of road, on both level and ascending and descending grades of various percentages, and on curves.

Vehicle behavior studies will show how details of road construction affect vehicular movement and how the general alignment of a road affects driving.

The space or time needed for safe stopping, turning and passing will be determined in driver studies.

Wisconsin Road Total

Wisconsin has spent a total of $920,759,942 on highways and bridges since the state highway commission was organized in 1912 up to 1936, the last year for which complete figures are available.

Automobile owners in these 24 years contributed $153,516,970 in the form of license fees and $121,701,451 in the form of gasoline taxes, a total of $275,218,426. The federal government contributed close to 58 million dollars and the general property tax payer nearly 530 millions.

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Queens Midtown Tunnel

New York Tunnel Authority and Walsh Construction Company Construct Another Step in the Program to Increase the Big City's Accessibility

By MORT FRIEDLANDER

WHEN the ancient Assyrians wanted to tunnel beneath the Euphrates River, the difficulties of subaqueous construction didn't trouble them. They diverted the stream from its normal channel. Then everybody walked to work. The advantages of this method are pretty obvious: certainly no Assyrian ever suffered from bends.

Modern tunneling began with Brunel's invention of the shield (1818; later modified by Barlow and Greathead). Its first application was in connection with the Thames Tunnel (1825-1843), the external cross-section of which (22'3" x 37'6") has since been exceeded only once. Working at normal pressure, the difficulties were enormous. Brunel and his son spent most of their time in a small boat directing the work. Considerably later (1879) the use of compressed air was introduced in tunneling, followed by the hospital lock (1889). Before Moir's introduction of this device the mortality among compressed air workers was twenty-five percent a year. On the recently completed Holland Tunnel (1927), with a record of 756,565 decompressions, there was not a single death from compressed air illness.

Purpose

The Queens Midtown Tunnel will span the East River between 41st and 42nd Sts., Manhattan, forming the latest in a series of underground and overhead highways designed to facilitate vehicular movement in and around New York City. The eastern terminus is at Long Island City. Specifically, the tunnel will relieve badly overtaxed cross river accommodations on which traffic increased from 53 million to 98 million vehicles annually between 1925 and 1937. Estimates for 1940 are around 120 million.

The new traffic artery will consist of two tubes each for eastbound and westbound travel. The entrance plazas have been carefully designed to allow easy access from all directions. Capacity will be about 16 million vehicles a year.

Permission for construction was granted by the State Legislature in 1935 on the condition that the project be self-supporting and self-liquidating. To this end the tunnel will be operated as a toll facility. The total cost, $58,365,000, represents a Federal Public Works Administration loan of $47,130,000 and an outright grant of $11,235,000. This makes it the largest non-federal public works undertaking in the country. Construction is expected to provide approximately 18 million man-hours of employment at the site and about 24,000,000 man-hours additional at the mines and mills in producing materials.

Construction

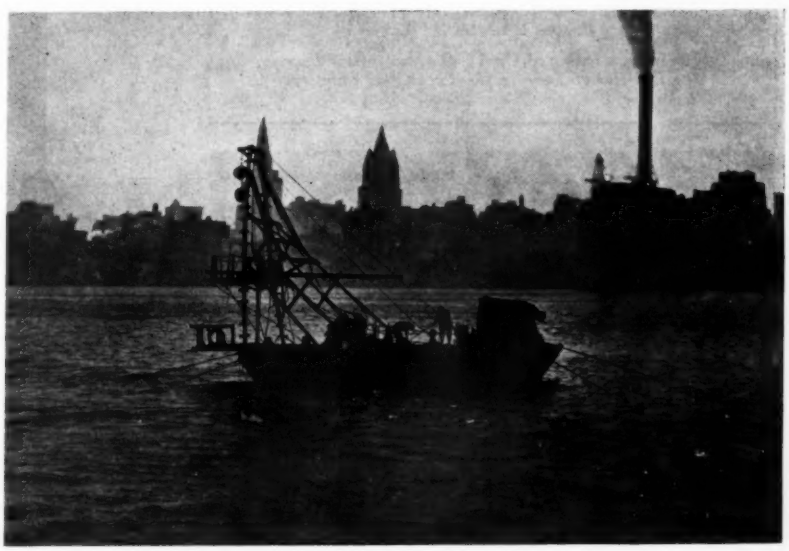
Because of the success of the Holland Tunnel, the new tunnels will be similar except for a slight increase in size to correspond with recent trends in vehicular design. The two-lane roadways will be 21' wide between curbs, with a clear headroom of 13'6". Ventilation will resemble that in the Holland Tunnel, air being supplied throughout from below the roadbed and drawn off at the top of the circular section. A ventilation building will be constructed on each side of the river. Other data on the two tubes are:

NORTH TUNNEL

westbound traffic
length—7785'
between portals—6435'

SOUTH TUNNEL

eastbound traffic
length—7500'
between portals—6270'



• Diamond drills, operating from barges anchored in the East River, made test borings for the $58,365,000 tunnel which will link Midtown Manhattan and Queens.

Length of under river portion—3055'
External diameter—31' and 32' 10"
Maximum upgrade—3.5%
Maximum downgrade—3.5%
Maximum depth of mean high water level to top of tunnel—73'
Normal maximum ventilation—2,826,000 cu. ft. per minute.

Operations, which were begun with the breaking of ground on October 2, 1936, are expected to be completed late in 1940. It is hoped to link this tunnel eventually with the Lincoln Tunnel by an underpass across Manhattan. In this way traffic will be able to flow directly from New Jersey to Long Island without reaching the surface of Manhattan. Future plans also contemplate extensions from Queens to Brooklyn and additional arteries to the north and east of the Long Island City plaza, connecting with the boulevard and park systems of the Long Island Park Commissions.

Geological conditions do not offer easy or uniform progress. Roughly, about one half of the driving will be in solid rock and the remainder through sand and gravel.

Where the tunnel is in soft ground or mixed face, the depth of the roof below river bed is not sufficient to support the air pressures that will be required. Clay will be brought in and dumped until the depth of cover is great enough to offset this deficiency. An interesting point is that the height to which this sub-surface fill has to be raised will be great enough to interfere with river traffic. During operations, therefore, a schedule of open and passable channels will be maintained.

The tunnel is to be cast-iron lined, plates varying from 1⅝" to 2⅞" in thickness. Each completed circular section will be held in place by 145 1¾" bolts. To expose the opened lengths of tunnel for lining, twenty-eight hydraulic jacks will advance the shield in 32" pushes. Each of the jacks is ten inches in diameter and capable of a piston pressure of 5,000 lb. per square inch.

Personnel

This 58 million dollar project is in charge of the New York City Tunnel Authority consisting of Commissioners Alfred B. Jones, Chairman, Albert T. Johnston and William H. Friedman, with P. Fearson Shortridge as Manager. Ole Singstad is the Chief Engineer with Wm. McK. Griffin as Deputy Chief Engineer, James H. Dugan as Engineer of Design and Jacob Mechanic, Engineer of Construction. Dr. Edward Levy is Consulting Physician. Professor Charles B. Berkey has been retained as Consulting Geologist and the J. G. White Engineering Corporation as Consulting Engineers. The Walsh Construction Company is the contractor for the underriver work.

The other day a young fellow who had just gotten his first job as truck driver on a highway job met a luscious blond.

"Say," he asked her. "How about a date for tonight?"

She looked at his downless face and said, scornfully, "Say, I can't go out with a baby."

"Pardon me," the young man said, "I didn't know."

Here Is a Bargain
in used excavating equipment

(taken from page 246)

OSGOOD—VICTOR—GAS 1½ YD. SHOVEL & Clamshell. Shovel boom 23'. Clamshell boom 50'. Wisconsin D-4—6 cylinder 5¾"x6½" engine. Reported excellent condition. Located Minneapolis. Box 1111-SS.

For other bargains in shovels, draglines, cranes, locomotives, trenchers, and miscellaneous contractors' equipment turn to pages 244 to 248.

The largest listing of Used Equipment offered by any Publication Serving the Excavating Industry.

HAYWARD BUCKETS
WON'T QUIT OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

ROEBLING
The pacemaker in wire rope development
WIRE · Wire Rope · Welding Wire · Flat Wire · Bare and Insulated Wires and Cables · Wire Netting and Cloth. John A. Roebling's Sons Co., Trenton, New Jersey.
Branches in Principal Cities

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RECLAIM 90% of all your OLD OIL

When you throw away used oil you throw away good money.

With the NEW Bucyrus Oil Reclaimer, used oil is reclaimed by a simple washing and filtering process at an average cost of about nine cents per gallon. It is a scientific fact, arrived at by leading research engineers and chemists throughout the country, that only the weaker and unstable oil molecules are broken down by the heat and friction of an engine. These constitute about 10 per cent of the oil—the other 90 per cent, the strongest particles of the original oil, is separated for re-use by the NEW Bucyrus Oil Reclaimer. This good oil provides a rich, efficient lubricant, equalling or bettering the performance of the original oil.

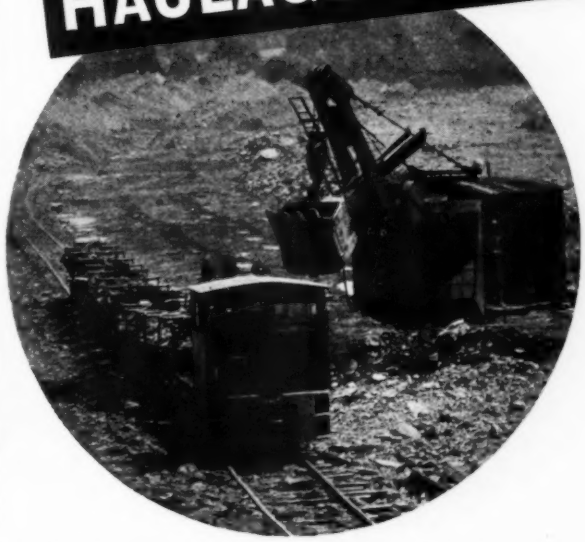
The Bucyrus Oil Reclaimer can be delivered to your job for less than $350 (in U.S.A.). Most owners get back the original cost from savings in the first few months of operation. Electrically operated and semi-automatic, the unit can be operated by any truck driver, yard attendant, or shop employee in less than a half-hour a day. There is no mess, no odor, no fire or explosion hazard with this self-contained unit.

Why throw good oil away?

Write today for more facts concerning the NEW Bucyrus Oil Reclaimer. T9-F

BUCYRUS-ERIE CO.
SOUTH MILWAUKEE, WISCONSIN

FROM Gumbo to Gold WHITCOMB HAULAGE WINS



The first mine locomotive was built by Whitcomb in 1906, and a few years later, Whitcomb adapted the gasoline motor to other types of industrial locomotives. You find them in far corners of the globe, hauling material of every description with economy and dispatch — moving everything from mountains to merchandise.

It's always "smooth going" for a Whitcomb Locomotive. A roadway of steel rails permits one man to haul many loads at one time, with less fuel cost. An equally important factor in their economy is long life and low upkeep. Put your haulage on rails, and investigate the advantages of equipment backed by the combined resources, experience and facilities of Whitcomb and Baldwin.

Our engineers will gladly make a survey of your needs and make impartial recommendations.

A size and type to suit your needs

Gasoline or Diesel Mechanical Drive
Gasoline or Diesel Electric Drive
Electric Storage Battery
Electric Trolley

THE WHITCOMB LOCOMOTIVE COMPANY
PLANT AT ROCHELLE, ILLINOIS
Subsidiary of The Baldwin Locomotive Works, Paschall Station Post Office, Philadelphia, Pennsylvania

WHITCOMB LOCOMOTIVES

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

NOT in the Contract

Fishermen who are planning a trip in the near future will be glad to know that there is no special change in the style of tackle this year, excepting that the bottle has more body and not quite so much neck.

The president called his office manager in and thrust a letter under his nose.

"Look at that! I thought I told you to engage a new stenographer on the basis of her grammar!"

The office manager looked startled. "Grammar? I thought you said glamour."

She—Say, it's past midnight. Do you think you can stay here all night?

He—Gosh, I'll have to telephone Mother first.

"Are you the man who gave my little brother the rabbit last week?"

"Yes."

"Well, Mother says you've got to come and take them all back."

First Window Washer—Look at that guy in there kissing another man's wife. Let's go in after the big bum!

Second Window Washer — All right, how soon do you think he'll leave?

A man boasted that he has been in every hospital in town.

"Impossible!" said a friend. "What about the maternity hospital?"

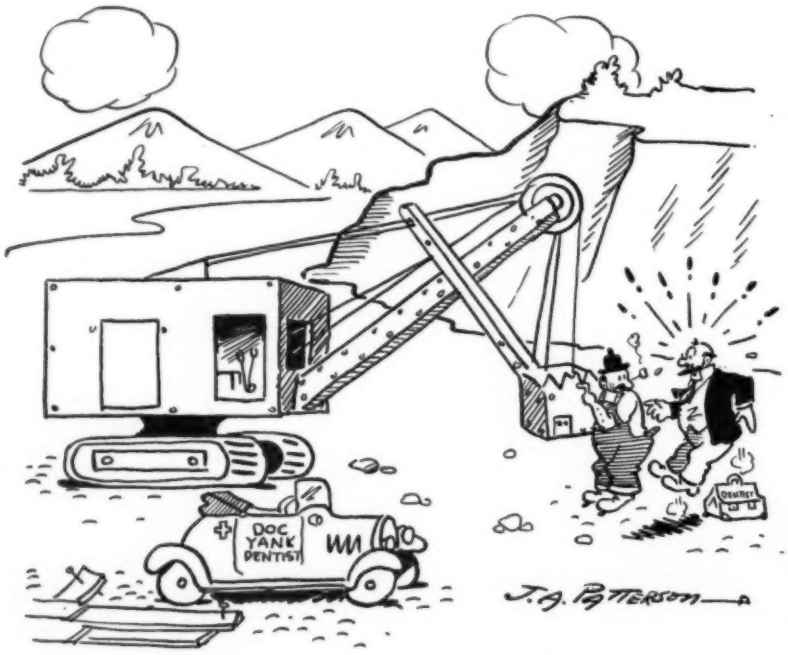
"I was born there."

Two young brothers were arguing. Said the elder, to clinch what he had been saying: "I ought to know, don't I go to school, stupid?"

"Yes," replied the other, "and you come home the same way."

Mrs. Bee: "That brazen Miss Vamp boasts that she has been kissed by every married man in town except one!"

Contractor Bee: "I wonder who he can be?"



"That's the one that's givin' her the trouble, Doc."

A young lady finding herself stranded in a small town, asked an old man at the station where she might spend the night.

"There ain't no hotel here," he said, "but you can sleep with the station agent."

"Sir!" she exclaimed, "I'll have you know I'm a lady."

"That's all right," drawled the old man, "so is the station agent."

Him: "And this, I suppose is one of those hideous caricatures you call modern art."

Her: "Nope, that's just a mirror."

Donald: You promised me sixpence if I was top boy at school, an' I've been top boy two weeks running.

Father (reluctantly): Well, here's a shilling, but ye must gi've up studying so hard. It's no guid for ye.

Traveling Contractor: Doesn't this ship tip a great deal?

Steward: No, sir, not that I've noticed. She leaves that to the passengers, sir.

"Schultz, why don't you fight against your longing for liquor. When you're tempted, think of your wife."

"Say, when the thirst is on me, I don't know what fear is!"

"They say kissing is unhealthy. What do you think?"

"Well, I've never been—"

"What, you've never been kissed?"

"No, I've never been ill as a result of it."

Typographical Error Department: "Coach Pelham again is active on the gridiron after having been laid up for several days with a bad coed."

Also—"Mrs. Anson Rogers, of West Forsythe Street, has gone to Reno for the removal of a large male on her neck."

DIRT-AND PLENTY OF IT

Tough Hauling But TIMKEN Bearings Take The Load

These "Caterpillar" 50's are hauling from a dragline on the Sam Hunter levee contract at Elane, Arkansas. TIMKEN Tapered Roller Bearings play their important part in these tractors just as they do in virtually all kinds of construction machinery—including shovels, graders, scraper wagons, concrete mixers and bulldozers.

"Mercury," New York Central Lines . . . . one of the latest Timken-equipped Streamliners

The universal preference for TIMKEN Bearings is a direct result of their superior performance. It pays to specify TIMKEN Bearings or to look for the "Timken Bearing Equipped" symbol when buying any kind of construction machinery.

TIMKEN ROLLER BEARING EQUIPPED

A symbol of quality for any piece of equipment with which it is associated

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

For your convenience in writing to The Timken Roller Bearing Company, you will find a card bound in this issue.

Stripping Coal

(Continued from Page 206)

When the roads are subjected to the wear and tear of the trailer loads, a Bucyrus-Erie bulldozer keeps them in condition. Besides conditioning the roads, the bulldozer can be seen darting below the boom of the shovel to clean up, gathering spillings from the trailers, gouging out any mud found on the coal, pulling cables and transformers when needed, taking care of the surface work, shaving back the spillings from the bank, and making itself generally useful all over the place.

To combat wet weather, the Little Sister has installed two 4 in. Wright pumps to keep the pit free from water where natural drainage cannot be employed. The pumping units, together with the starting units, are skid-mounted. It is possible, by leaving openings in the spoil banks, to drain the pit to Little Sister creek since the coal is located above the natural drainage level. All the necessary trenching on the high wall for drainage is performed by a Northwest utility dragline with 1½-cu. yd. bucket.

Private Plant Supplies Power

A ground-cable distribution system receiving current at 4,000 volts from the power house supplies electrically operated pit equipment. Both the stripping shovel (General Electric motor generators, motors and controls, variable-voltage control) and the loading shovel (Westinghouse motor generator, motors and controls, variable voltage-control) operate off the 4,000-volt circuit. 440-volt motors, receiving current from auxiliary transformers and control stations placed as required at the junction boxes on the high wall, deliver power to all electrically operated pit equipment. To permit the maximum of operation without changing cable connections on the high wall, 2,000 ft. long cables were installed on both the stripper (No. 1 wires) and the loader (No. 8 wires). All connections are made with Miller cable connectors.

Designed around a reconditioned boiler, generating, and some auxiliary equipment, revealed Plant Superintendent Case, the generating plant that supplies power for all electrical equipment at the Little Sister mine represents an investment of approximately $200,000. The plant was devised to consume the slurry from the dewatering screens in the washery.

When the loaded trailers come up from the pit, the coal is dumped into a 75 ton hopper from which it is removed by a feeder and is discharged onto a belt conveyor loading up to the head of the main shaker screen. This screen separates the feed into four sizes: 8 in. lump, 8x4 in. egg, 4x2 in. small egg, and 2 in. screenings. If any combination is desired, a mixing conveyor permits loading of hand-picked and washed mine-run or any combination of the primary sizes. The lump and egg sizes, after passing over degradation screens, are discharged onto shaking picking tables, one for each size. Picking is arranged to yield two reject products—one pure refuse (rock, slate, sulphur, etc.), and the other containing coal values which can be salvaged.

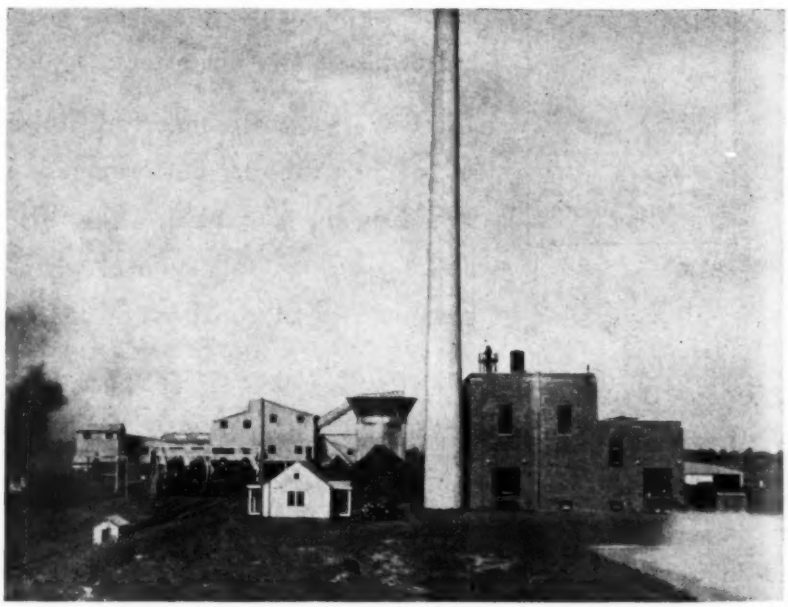
88 per cent of the coal mined is usable though 5 per cent of that figure consists of the slurry which is consumed at the power plant. The preparation plant, designed and installed by the Link-Belt Co., has a rated capacity of 450 tons per hour.

A 70x130 ft. corrugated-steel building houses the trucks and transportation equipment. Trucks are greased once a day and motors and tires are inspected regularly in the machine shop and service floor which are also inclosed in this building. Off from the machine shop is a washroom with facilities for 55 men. Repair work is done by the shovel crew. 105 men are on the payroll of the mine.

Personnel

Executive personnel of Little Sister is: H. J. Sternberg, President; H. N. Case, Plant Superintendent; and George Wilson, Pit Superintendent.

Operators on the 550-B are: Clyde Cox; Frank Goalby; and A. V. Barbre. Odis Rice operates the 85-B coal loader.



• Here's the modern plant of the Little Sister Mine. In the center foreground is the office, behind which are tipple and washing plant. The tall chimney adjoins the power plant. Garage and shop are at the right, with power plant cooling pond in extreme right foreground.

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MICHIGAN, DETROIT: Abrams-Anderson Co., 10425 Northlawn Ave.
MINNESOTA, DULUTH: Wm. H. Ziegler Co., Inc., 22 North 4th Ave. West, Phone Melrose 681.
MINNEAPOLIS: Wm. H. Ziegler Co., Inc., 2331 University Ave. S. E., Phone Gladstone 7971.
MISSISSIPPI, JACKSON: Mississippi Road Supply Co. Telephones: Long Distance 9006, Local 3676.
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BUCYRUS ERIE

Hot Air Rises

(Continued from page 215)

only a hundred yards or so off. He was scared a bit, but when I showed him the plate, he forgot all about everything else."

"How about the shovel? Badly wrecked?"

"Not so bad, Mr. Itch. It can be fixed up very easily. I'm selling it to a local contractor at a bargain price. With the loss I'm taking on it, and with all my expenses, I'm still three thousand dollars ahead on the deal."

"Swell! You can take a nice vacation on that. Why don't you . . ."

"I'm going to, Mr. Itch. But while I'm vacationing, I'll keep an eye open, and if I run across anything in your line, I'll let you know. Maybe I'll find something interesting."

"That, William," said Mr. Itch sadly, "is just what I'm afraid of."

Book reviews

New literature for 1938 has been announced by the **Austin-Western Road Machinery Company**, Aurora, Illinois. A general pictorial catalog, "Built to Outperform," illustrates the complete line of Austin-Western units, and the new "99 Motor Grader" book defines the four wheel driving and steering characteristics, and shows other mechanical features of the grader.

Three attractive, multi-colored catalogs are ready for distribution by the Tractor division of **Allis-Chalmers**, West Allis, Wisconsin. The first, titled "Model S-O Controlled Ignition Oil Tractors" shows on-the-job photographs of various A-C installations, new mechanical features, and detailed specifications, the second, "Faster Power" illustrates the tractor and road equipment line, while the third, "Engines and Power Units" specifies, and diagramatically presents the power units used by Allis-Chalmers.

A new book "Wire Rope's Natural Enemies" recently published by the **Hazard Wire Rope Division** of the American Chain and Cable Company, Inc., Wilkes-Barre, Pennsylvania, is a constructive treatise on the many things that wear out rope and how either to avoid them or minimize their effect. Sheaves, reverse bends, kinking, whipping, abrasion and many other "enemies" of wire rope are discussed separately and in simple, non-technical language.

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TRUCK CRANES and SHOVELS

UNIVERSAL GAS TRUCK CRANE. Full revolving. 20' boom. ⅝-yard Kiesler clamshell bucket with teeth. 4-wheel Mack truck. 4-cylinder 4⅜"x6½" engine. Good operating condition. Located Chicago. Box 2071-SCC.

UNIVERSAL GAS TRUCK CRANE. Full revolving. 25' boom. ⅝-yard Kiesler clamshell bucket with teeth. 6-wheel Mack truck. 4-cylinder 4¾"x6½" engine. Good operating condition. Located Chicago. Box 2072-SCC.

UNIVERSAL—THEW Model AC-35, ½-yard gasoline truck crane. 28' boom. ½-yd. Owens digging bucket. Mack truck equipped with dual hard tires rear and pneumatic tires front. Condition good. Located Central New York State. Box 1193-SCC

SMALL SHOVELS
Under 2 Yards

BUCYRUS-ERIE 10-B GAS—combination shovel, drag shovel and clamshell. 14" Cat. treads. Hercules 6-cyl. engine. Good condition. Favorable price. Located Central N. Y. State. Box 2000-SS.

½-YARD

BROWNING—½-YARD GASOLINE SHOVEL and clamshell. Clamshell boom 30' plus 10' extension. Clamshell bucket included. Located Maine. Box 1115-SS.

BUCYRUS-ERIE — TYPE A, ½-yard steam shovel. Cat. mounted. 26' boom clamshell equipment. Located Central Illinois. Box 2007-SS.

BUCYRUS-ERIE 16-B GAS SHOVEL. 16'6" boom—12'6" dipper handle—½ cubic yard cast front inserted tooth dipper. Waukesha 6 cylinder 3¾"x4¾" gasoline engine. Excellent condition. Will demonstrate. Located western New York State. Box 930-SS.

MEAD MORRISON ½-yard Gas Shovel and 35' boom dragline including ½-yd. Page drag bucket. Good operating condition. Located Minnesota. Box 2081-SS.

P & H—MODEL 300—½-yard gasoline shovel. Reconditioned. Located Kentucky. Box 1107-SS.

⅝-YARD

BUCYRUS-ERIE TYPE "AA" Air Tunnel Shovel. Cat mounted 2 speed. Will work in 14' clearance. Reconditioned. In first class condition. Located New York. Box 2070-SS.

BUCYRUS-ERIE Type A steam shovel. 16' boom. 12'-6" dipper handle. ⅝ yard shallow cut dipper. Two speed propelling mechanism. Hand operated boom hoist. Located vicinity New York. Box 958-SS.

BUCYRUS-ERIE TRAILER, suitable for 17-B or 19-B machine. Practically new. Located Boston. Box 1116-SS

¾-YARD

BUCYRUS-ERIE TYPE B Steam Shovel. ¾-yard Quarry dipper. Cat mounted. New boiler installed late 1935. Good operating condition. Located Georgia. Box 2073-SS.

BUCYRUS-ERIE — TYPE B, ¾-yard steam shovel and 40' boom clamshell. Cat. mounted. Located Buffalo, New York. Box 2005-SS.

BUCYRUS-ERIE TYPE B steam shovel. High lift. Boiler reported good condition and machinery generally in fair condition. Located Rockford, Illinois. Box 963-SS.

BUCYRUS-ERIE TYPE B STEAM combination Shovel-clamshell and steam hoe. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

BUCYRUS-ERIE (2) TYPE "B" HIGH LIFT Caterpillar mounted Steam Shovels. Good operating condition. Located Eastern Pennsylvania. Box 1014-SS.

BUCYRUS-ERIE TYPE B Steam shovel, caterpillar mounted. Located Indiana. Box 983-SS.

BUCYRUS-ERIE 1030 gasoline shovel and clamshell. 23' shovel boom. 15' dipper handle ¾ yard dipper. 35' clamshell boom and Owen "M" Model 230 clamshell bucket. Wisconsin B-3 gasoline engine. Cylinder blocks recently rebored. Machine in fair condition. Located Massachusetts. Box 982-SS.

BUCYRUS-ERIE—Type B Steam Shovel and Clamshell. 19'9" Shovel Boom—16' Dipper Handle—¾-yard Dipper. 40' Clamshell Boom. Also Ford Truck with 500-gallon steel water tank and pump. Reported to be in good operating condition. Located New Hampshire. Box 1164-SS.

BUCYRUS-ERIE TYPE B high lift steam shovel. Excellent operating condition. Located Seattle, Washington. Box 943-SS.

BUCYRUS-ERIE—TYPE B ¾ YD. Caterpillar mounted Extra high-lift steam shovel. Located Chicago. Good working order. Will rent or sell. Box 1100-SS.

BUCYRUS-ERIE TYPE B steam ¾-yard shovel and 36' boom clamshell including ¾-yard Williams clamshell bucket. Located Central New York. Box 1188-SS.

NORTHWEST—MODEL 105, ¾ yard gasoline shovel. Climax 4 cylinder 5½"x7" gasoline engine. Good operating condition. Located Eastern Pa. Box 1015-SS.

NORTHWEST MODEL 105 Combination shovel and clamshell. 24' shovel boom. 17½' dipper handle. ¾-yard dipper. 40' clamshell boom. Type "C" Lakewood 1-yard clamshell bucket. Twin City gasoline engine. Reasonably good condition. Located near Chicago. Box 2045-SS.

OSGOOD — GASOLINE — COMBINATION shovel, clamshell, and dragline equipped with electric starter. Shovel Boom 19'6"—Dipper Handle 14'—Dipper 1 yard standard and 1½ Beet Loading Type. 40' Clamshell and Dragline Boom. Hercules 6 cylinder 85 H.P. engine. Fair condition — good appearance. Located Colorado. Box 1018-SS.

OSGOOD. COMMANDER. Combination shovel, dragline and clamshell. ¾-yard Rock Type dipper. 35' dragline and clamshell boom. ¾-yard Page drag bucket. Hercules 6-cylinder 4⅛"x4½" engine. Completely rebuilt recently and new engine installed. Bucket very good. Will sell on terms. Located Texas. Box 2038-SS.

FOR SALE

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⅞-YARD

BUCYRUS-ERIE B-2. Extra High Lift shovel. 21'3" boom. 18'4" dipper handle. ⅞-yard dipper. Well cared for. Good condition. Located Rhode Island. Box 2047-SS.

BUCYRUS-ERIE B-2 High Lift Steam Shovel. Single Shaft Cat. Exceptionally good condition. Located Connecticut. Box 2078-SS.

BUCYRUS-ERIE B-2. Extra High Lift steam shovel. 21'3" boom. 18'4" dipper handle. ⅞-yard dipper. Cat. mounted. Fair working condition. Located Chicago. Box 2039-SS.

BUCYRUS-ERIE—1035 GASOLINE SHOVEL. Chain Crowd. ⅞-yard Dipper. 26-in. caterpillar treads. Electric starter. Needs some repairs. Located vicinity Boston. Box 1065-SS.

BUCYRUS-ERIE—B-2—HIGH LIFT Caterpillar Mounted Steam Shovel. Good Operating condition. Located Eastern Pennsylvania. Box 1019-SS.

BUCYRUS-ERIE TYPE B-2, ⅞-YARD high lift steam shovel. Located Boston. Box 1089-SS.

BUCYRUS-ERIE TYPE B-2, ⅞-YARD high lift steam shovel. Located Lawrence, Mass. Box 1090-SS.

2—BUCYRUS-ERIE—B-2—HIGH LIFT STEAM shovels. 21'3" booms, 16' dipper handles, ⅞-yard dippers. Power boom hoists. Single shaft caterpillars. Located Massachusetts. Box 1119-SS.

BUCYRUS-ERIE—B-2—HIGH LIFT STEAM shovel. 21'3" boom, 16' dipper handle, ⅞-yard dipper. Single shaft caterpillar. Located Vermont. Box 1135-SS.

BUCYRUS-ERIE—Type B-2 Steam Shovel. Reported fair operating condition. Located near Boston. Box 1167-SS

BUCYRUS-ERIE—TYPE B-2 high lift steam shovel. 19'9" boom—16' dipper handle—⅞-yd. dipper. Cat. mounted. Reasonably good condition. Box 1175-SS

MARION MODEL 21 — ⅞ CUBIC YARD steam shovel. Caterpillar mounted. Good working condition. Located Georgia. Box 758-SS.

1-YARD

BUCYRUS-ERIE 32-B—Gasoline chain crowd 1-yard shovel. Electric starter. Single shaft cats. Wisconsin 6-cylinder 5"x6" engine. Few minor repairs needed. Otherwise excellent condition. Located near Boston. Box 2061-SS.

BUCYRUS-ERIE GA-2 GAS-AIR SHOVEL. 22'6" boom—16' dipper handle—one yard dipper. Waukesha four cylinder 5¾"x8" engine. Overhauled approximately one year ago. Fair condition. Located Knoxville, Tennessee. Box 870-SS.

BUCYRUS-ERIE—GA-2 Gas-Air High Lift 1 yard shovel. Air starter. Single Shaft Cat. Fair condition. Located Western New York. Box 996-SS.

BUCYRUS-ERIE GA-2 COMBINATION shovel and clamshell. 24' boom. 18'4" dipper handle—1 cu. yd. cast front inserted tooth dipper. 45' boom. Complete clamshell equipment including 1 yard Williams Fav. Clamshell bucket. Air starter. Single shaft cat. Waukesha 4 cylinder 5¾"x8" gas engine. Fair operating condition. Located Eastern Pennsylvania. Box 932-SS.

BUCYRUS-ERIE GA-2 — Gas-air — high lift shovel. Good operating condition. Located Eastern Pennsylvania. Box 945-SS.

BUCYRUS-ERIE 1030 — ELECTRIC TUNNEL shovel. Boom 10 ft. 7 in. Dipper handle 10 ft. 5 in. 1-yd. dipper. Boom hoist 5 ft. 6 in. rear end clearance. 2 motor—power supply 3 phase, 60 cycle, 440 volt. Located Virginia. Box 1068-SS

BUCYRUS-ERIE—D-2 1 yard Diesel Shovel. Atlas engine. Said to be in very good condition. Located South Carolina. Box 1079-SS

BUCYRUS-ERIE GA-2 SHOVEL AND CRANE 22 ft. 6 in. shovel boom, 16-ft. dipper handle, 1 cu. yd. cast front inserted tooth dipper, 50-ft. box type crane boom. Air starter. Good condition. Located Newark. Box 718-SS.

BUCYRUS-ERIE 31-B — 1 YARD STEAM shovel. Located Lawrence, Mass. Make an offer. Box 1092-SS.

BUCYRUS-ERIE 32-B—Gasoline chain crowd shovel. Electric starter. Single shaft cats. Wisconsin 6-cylinder 5"x6" engine. Few minor repairs needed. Otherwise excellent condition. Located near Boston. Box 2062-SS.

BUCYRUS-ERIE 31-B — 1 YARD STEAM SHOVEL. Located Tennessee. Box 1093-SS.

BUCYRUS-ERIE — GA-2 — GAS-AIR — extra high lift shovel. 24' boom, 16' dipper handle, 1-yard dipper. Air starter. Mass. air tanks. Single shaft caterpillar. Located Massachusetts. Box 1121-SS.

BUCYRUS-ERIE—31-B STEAM SHOVEL. 22' boom, 15' dipper handle, 1-yard dipper. Now operating, can be demonstrated. Located Alabama. Box 1130-SS.

BUCYRUS-ERIE—Type B-2 Steam Shovel. Reasonably good condition. Located near Boston. Box 1156-SS

BUCYRUS-ERIE—30-B Electric Shovel. Suitable for power supply. 3 Phase, 60 Cycle, 440 Volt. Machine equipped with 3 motors. Said to be in first class operating condition. Located New Jersey. Box 1162-SS

LORAIN—MODEL 60—1-YARD shovel. Located Southern Virginia. Box 1182-SS

MARION MODEL 7, 1-yard steam shovel. Has not operated in the past five years. New flues recently installed in boiler. Located Buffalo, New York. Box 2006-SS.

MOORE—SPEED CRANE. 1-yd. shovel and 50' boom dragline and crane. Gasoline. Located St. Paul, Minn. Box 2012-SS.

NORTHWEST — MODEL 105 — GASOLINE shovel and clamshell—1-yard. Located Massachusetts. Box 1123-SS.

P&H MODEL 600A Gas 1-yard Shovel and 40' boom crane. Electric starter and lights. Waukesha 4 cylinder 6"x7" Model J. L. engine. $1500 recently spent overhauling. Good condition and appearance. Located Central Wisconsin. Box 2084-SS.

P&H MODEL 600, 1-yard gas shovel. 23' boom. 16'9" dipper handle. 1-yard dipper. Waukesha 4-cylinder 6"x7" engine. New type internal clutches, fuel pump instead of vacuum pump. Good condition except few minor repairs needed. Located Chicago. Box 2040-SS.

P. & H. MODEL 600—1-YARD GAS SHOVEL and 40' boom clamshell. Waukesha JL-6"x7" Engine. Located North Carolina. Box 1095-SS.

P & H—MODEL 600, 1 YD. SHOVEL and dragline. Shovel boom 19'6". Dragline boom 40'. Drag bucket included. Waukesha engine. Good condition. Located Central Illinois. Box 1102-SS.

1¼-YARD

BUCYRUS-ERIE. GA-2, Gas-Air. 1¼-yard shovel. Electric starter. Waukesha W.L. 4-cylinder 6¼"x8" engine. Single shaft cat. Extensively repaired recently. Located Texas. Box 2050-SS.

BUCYRUS-ERIE GA-2—Gas-Air shovel. 22'6" boom—16' dipper handle—1¼-yd. dipper. Shop No. 10761. Has had very little use and is in very good condition. Located Maryland. Box 2060-SS.

BUCYRUS-ERIE E-2 shovel and dragline. 1½-yard Plate dipper. 45' boom plus 10' extension. 1¼-yard Page drag bucket. Electric light plant. Atlas Diesel engine. Engine overhauled since last used. Balance of machine good operating condition, except minor repairs needed. Located Louisiana. Box 2053-SS.

BUCYRUS-ERIE—GA-2 Gas-Air High Lift Shovel. 24-ft. boom, 16-ft. dipper handle, 1¼-yard dipper. Located Virginia. Box 1063-SS.

BUCYRUS-ERIE—GA-2 Gas-Air 1¼ yd. shovel. 45' boom clamshell machine. Single Shaft Cat. Recently overhauled by owner. Located New York. Box 997-SS.

BUCYRUS-ERIE—GA-2 Gas-Air—1¼ high lift shovel. Single Shaft Cat. Electric Starter. Reported good operating condition. Located Eastern Pennsylvania. Box 998-SS.

TWO—BUCYRUS-ERIE—GA-3, GAS-AIR 1¼-yard shovels, Wisconsin D-2—6 cyl. 5¼"x6½" Engines. Good condition. St. Paul, Minnesota. Box 1097-SS.

BUCYRUS-ERIE 41-B — 1¼-YARD STEAM SHOVEL. Located near Boston. Very good price. Box 1096-SS.

BUCYRUS-ERIE—41-B—STEAM SHOVEL. 21' boom, 15' dipper handle, 1¼-cubic yard dipper. Now operating. Will demonstrate. Located Alabama. Box 1131-SS

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EXCAVATING engineer
South Milwaukee, Wis.

BUCYRUS-ERIE GA-3 Gas-Air 1¼-yard shovel. Electric starter. Steel cab. Single shaft Cat. Said to be in very good mechanical and operating condition. Located San Francisco. Box 1191-SS.

BUCYRUS-ERIE GA-2—Gas-Air 1¼-yard high lift shovel. Single shaft cat. Air starter. Massachusetts air tanks. Waukesha 4-cylinder 6¼"x8" engine. Good operating condition. Located Maine. Box 2064-SS.

BUCYRUS-ERIE GA-2—Gas-Air 1¼-yard high lift shovel. Electric starter. Single shaft cat. Massachusetts air tanks. Waukesha 4-cylinder 6¾"x8" engine. Good operating condition. Located Vermont. Box 2065-SS.

BUCYRUS-ERIE GA-2—Gas-Air 1¼-yard extra high lift shovel. Electric starter. Single shaft cat. Massachusetts air tank. Waukesha 4-cylinder 6¼"x8" engine. Located Maine. Good operating condition. Box 2066-SS.

BUCYRUS-ERIE GA-3—Gas-Air 1¼-yard high lift shovel and 45' boom clamshell machine. Electric starter. Single shaft cat. Waukesha 4-cylinder 6¼"x8" engine. Few minor repairs needed. Otherwise excellent condition. Located New Jersey. Box 2058-SS.

KOEHRING MODEL 501 1¼ yard gas shovel. Available about August 15. Located New Mexico. Box 879-SS.

LIMA MODEL 101. 1¼-yard gas shovel. Located Lampasas, Texas. Box 2027-SS.

LIMA MODEL 101. 1¼-yard gas shovel. Located New Braunfels, Texas. Box 2029-SS.

LIMA MODEL 101. 1¼-yard gas shovel. Located Catarina, Texas. Box 2028-SS.

LIMA MODEL 101. 1¼-yard gasoline shovel. 26' boom. 17' dipper handle. Waukesha Model J. K. 6½"x7" engine. Recently rebuilt. Excellent condition. Located Texas. Box 2042-SS.

LINK-BELT — MODEL K-38. Equipped with 1½-yd. Esco dipper and 50' boom dragline including bucket. Weight of machine only 82,000 lbs. Waukesha W.K. 6¾"x8" engine. Overhauled Spring 1937. Not used since. Located vicinity Spokane, Washington. Box 2015-SS.

2 MARION Model 450—Steam Shovels. Good condition. Located Connecticut. Box 1154-SS

MARION TYPE 32 STEAMER. Shop No. 5676, 18-ft. boom, 15-ft. dipper handle, 1¼-cu. yd. Recently overhauled. Box 451-SS.

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

SMALL SHOVELS
Under 2 Yards continued

NORTHWEST MODEL 104, gasoline 1¼-yd. shovel and crane. Located State of Washington. Available March 1. Box 2018-SS.

OSGOOD — HEAVY DUTY — 1¼-yard Steam Shovel. Said to be in good working condition. Will sell on terms. Located Virginia. Box 1061-SS

OSGOOD. 1¼-yard gasoline shovel. 1-yard dipper also available. 4-cylinder Leroi gas engine. Only operated three months since $2,000 repairs applied. Excellent condition. Located Texas. Box 2043-SS.

1½-YARD

BUCYRUS-ERIE 37-B Gas 1½-yd. Shovel and 45' boom plus 5' extension dragline including 1½-yd. drag bucket. Electric starter. 30" treads. Wisconsin D-3 engine. Fair condition. Located Kansas. Box 2076-SS.

BUCYRUS-ERIE—42-B STEAM shovel. 1½-yard Vanderhoef quarry dipper. Very good mechanical condition. Can be demonstrated. Located Georgia. Box 1149-SS.

BUCYRUS-ERIE 37-B—1½ yard Chain crowd gas shovel. Wisconsin D-3 engine. Located Minnesota. Box 2075-SS.

OSGOOD—VICTOR—GAS 1½ YD. SHOVEL & Clamshell. Shovel boom 23'. Clamshell boom 50'. Wisconsin D-4—6 cylinder 5¾"x6½" engine. Reported excellent condition. Located Minneapolis. Box 1111-SS.

1¾-YARD

BUCYRUS-ERIE 43-B—Diesel shovel. 2 yard dipper. Caterpillar Diesel D13000 engine. Reported good operating condition. Located New Mexico. Box 2074-SS.

BUCYRUS-ERIE 43-B late model 1¾-yd. chain crowd shovel. Electric starter. 1½ K.W. Kohler light plant. Buda-Lanova 6-cylinder 5¼"x7" Diesel engine. Located Central New York State. Excellent condition. Box 2019-SS.

5—MARION MODEL 37, 1¾ yard steam shovels, steel cab. Good working condition. Located Minnesota. Box 825-SS.

P&H MODEL 750, 1¾-yd. Diesel Shovel and 60' boom dragline with bucket. 1500 Watt Kohler light plant. Atlas Diesel 6-cyl. 7"x8½" engine. Located California. Box 2014-SS.

SMALL DRAGLINES
Under 2 Yards

½-YARD

MEAD-MORRISON, ½-yard 35' boom dragline and gas shovel, including ½-yd. Page drag bucket. Good operating condition. Located Minnesota. Box 2081-SD.

¾-YARD

NORTHWEST MODEL 105 GAS—40' boom dragline and clamshell, including Page "C" drag bucket. Climax engine. Reasonably good operating condition. Located Atlanta, Ga. Box 995-SD.

OSGOOD — GASOLINE — COMBINATION dragline, clamshell and shovel equipped with electric starter. 40' dragline and clamshell boom. Shovel boom 19'6" dipper handle 14'; dipper 1 yard standard and 1½ beet loading type. Fair condition, good appearance. Located Colorado. Box 1018-SD.

OSGOOD. COMMANDER. Combination dragline, shovel and clamshell. 35' dragline and clamshell boom. ¾-yard Page drag bucket. ¾-yard Rock Type dipper. Hercules 6-cylinder 4⅛"x4½" engine. Completely rebuilt recently and new engine installed. Bucket very good. Will sell on terms. Located Texas. Box 2038-SD.

⅞-YARD

BUCYRUS-ERIE—1035—40' BOOM GASOLINE dragline and clamshell, including 1-yard dragline and clamshell buckets. 26" caterpillar treads. Recently overhauled. Located Colorado. Box 1118-SD.

1-YARD

BUCYRUS-ERIE D-2 40' Boom Diesel Dragline. 1½-yd. Light weight drag bucket. Kohler Light plant. Atlas engine. Fairly good operating condition. Located Northern Texas. Box 2086-SD.

BUCYRUS-ERIE DA-2 DIESEL-AIR 40' BOOM dragline. No bucket. Atlas Diesel engine. Located Eastern Pennsylvania. Box 872-SD.

BUCYRUS-ERIE — D-2 — DIESEL DRAGLINE. Atlas engine. Located Texas. 40' Boom, 1¼ yd. Page Bucket. Field reconditioned. Available about September 15. Excellent mechanical and operating condition. Box 1020-SD.

If You Do Not Find What You Want Listed—Write Us
EXCAVATING engineer
South Milwaukee, Wis.

MOORE—SPEED CRANE — 50' boom—1-yd. dragline and shovel. Gasoline. Located St. Paul, Minn. Box 2012-SD.

NORTHWEST—MODEL 105—gasoline clamshell and shovel—1-yard. Located Massachusetts. Box 1123-SCC.

P & H MODEL 600, 1 YD. DRAGLINE and shovel. Dragline boom 40'. Shovel boom 19'6". Drag bucket included. Waukesha engine. Good condition. Located Central Illinois. Box 1102-SD.

1¼-YARD

BUCYRUS-ERIE E-2 dragline and shovel. 45' boom plus 10' extension. 1¼-yard Page drag bucket. 1½-yard plate dipper. Electric light plant. Atlas Diesel engine. Engine overhauled since last used. Balance of machine good operating condition, except minor repairs needed. Located Louisiana. Box 2053-SD.

LINK-BELT — MODEL K-38. Equipped with 50' boom dragline including bucket. Also 1½-yd. Esco dipper. Weight of machine only 82,000 lbs. Waukesha W.K. 6¾"x8" engine. Overhauled Spring 1937. Not used since. Located vicinity Spokane, Washington. Box 2015-SD.

P & H—MODEL 210—55' boom dragline including 1¼-yard Page bucket. Gas powered. Located South Dakota. Box 1172-SD

1½-YARD

BUCYRUS-ERIE 37-B 1½-yard gas dragline and shovel. 45' dragline boom plus 5' extension, including 1½-yd. drag bucket. Electric starter. 30" treads. Wisconsin D-3 engine. Fair condition. Located Kansas. Box 2076SD.

1¾-YARD

NORTHWEST. Type M—Gas Dragline. 40' plus 10' Extension Boom. 1¾-yard Omaha Bucket—nearly new. Recently put in good repair. Located Missouri. Box 1161-SD.

P&H MODEL 750, 1¾-yd. Diesel 60' boom dragline and shovel. With bucket. 1500 Watt Kohler light plant. Atlas Diesel 6-cyl. 7"x8¼" engine. Located California. Box 2014-SD.

SMALL CLAMSHELLS AND CRANES
Under 2 Yards

⅜-YARD

BAY CITY—⅜-YARD GAS CLAMSHELL. Located near Boston. Box 1084-SCC.

BUCYRUS-ERIE 10-B GAS—combination clamshell, shovel and drag shovel. 14" Cat. treads. Hercules 6-cyl. engine. Good condition. Favorable price. Located Central N. Y. State. Box 2000-SCC.

½-YARD

BUCYRUS-ERIE — TYPE A, ½-yard steam clamshell and shovel. 26' clamshell boom. Cat. mounted. Located Central Illinois. Box 2007-SCC.

BROWNING—½-YARD GASOLINE clamshell and shovel. Clamshell boom 30' plus 10' extension. Clamshell bucket included. Located Maine. Box 1115-SCC.

BYERS-BEARCAT gasoline combination crane, skimmer scoop and back hoe. Williams Clamshell bucket included. Located Eastern Pennsylvania. Box 957-SCC.

⅝-YARD

P & H MODEL 204. 35' boom gasoline clamshell. ⅝-yard Kiesler clamshell bucket. Waukesha engine. New cab. Generally very good condition. Located Chicago. Box 2036-SCC.

¾-YARD

BUCYRUS-ERIE—TYPE B, ¾-yard, 40' boom steam clamshell and shovel. Cat. mounted. Located Buffalo, New York. Box 2005-SCC.

BUCYRUS-ERIE 1030 gasoline clamshell and shovel 35' clamshell boom and Owen "M" Model 230 clamshell bucket. 23' shovel boom. 15' dipper handle. ¾ yard dipper. Wisconsin B-3 gasoline engine. Cylinder blocks recently rebored. Machine in fair condition. Located Massachusetts. Box 982-SCC.

BUCYRUS-ERIE TYPE B STEAM combination clamshell, shovel and steam hoe. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SCC.

BUCYRUS-ERIE—TYPE B Steam clamshell and shovel. 40' clamshell boom. 19'9" shovel boom —16' dipper handle—¾-yard dipper. Also Ford truck with 500-gallon steel water tank and pump. Reported to be in good operating condition. Located New Hampshire. Box 1164-SCC.

BUCYRUS-ERIE TYPE B, steam, ¾-yard 36' boom clamshell and shovel, including ¾-yard Williams clamshell bucket. Located Central New York. Box 1188-SCC.

NORTHWEST MODEL 105 GAS—40' boom clamshell and dragline, including Page "C" drag bucket. Climax engine. Completely reconditioned. Located Atlanta, Ga. Box 995-SCC.

NORTHWEST MODEL 105, combination clamshell and shovel. 40' clamshell boom. Type "C" Lakewood 1-yard clamshell bucket. 24' shovel boom. 17½' dipper handle. ¾-yard dipper. Twin City gasoline engine. Reasonably good condition. Located near Chicago. Box 2045-SCC.

OSGOOD — GASOLINE — COMBINATION clamshell, dragline and shovel equipped with electric starter. 40' clamshell and dragline boom. Shovel boom 19'6"; dipper handle 14'; dipper 1 yard standard and 1½ beet loading type. Fair condition, good appearance. Located Colorado. Box 1018-SCC.

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

⅞-YARD

BUCYRUS-ERIE — 1035 ELECTRIC clamshell. 35' boom. ¾ yd. Haiss Coal loading bucket. General Electric motor, 40 H.P. 3 phase. 60 cycle, 220 volt induction motor. Machine in excellent condition. Located New York. Box 1101-SCC.

BUCYRUS-ERIE—1035—40' BOOM GASOLINE clamshell and dragline, including 1-yard clamshell and dragline buckets. 26" caterpillar treads. Recently overhauled. Located Colorado. Box 1118-SCC.

OSGOOD. COMMANDER. Combination clamshell, dragline and shovel. 35' clamshell and dragline boom. ¾-yard Page drag bucket. ¾-yard Rock Type dipper. Hercules 6-cylinder 4⅛"x4½" engine. Completely rebuilt recently and new engine installed. Bucket very good. Will sell on terms. Located Texas. Box 2038-SCC.

1-YARD

BUCYRUS-ERIE GA-2 COMBINATION shovel and clamshell. 24' boom, 18'4" dipper handle —1 cu. yd. cast front inserted tooth dipper. 45' boom. Complete clamshell equipment including 1 yard Williams Fav. Clamshell bucket. Air starter. Single shaft cat. Waukesha 4 cylinder 5¾"x8" gas engine. Fair operating condition. Located Eastern Pennsylvania. Box 932-SCC.

BUCYRUS-ERIE — GA-2 — GAS-AIR 45' Boom Clamshell Machine. Good Operating Condition. Located St. Paul, Minn. Box 1024-SCC.

BUCYRUS-ERIE GA-2 CRANE AND SHOVEL. 50-ft. box type crane boom, 22 ft. 6 in. shovel boom, 16-ft. dipper handle, 1 yard cast front inserted tooth dipper. Air starter. Good condition. Located Newark, N. J. Box 718-SCC.

BUCYRUS-ERIE — GA-2 GAS AIR Clamshell. 45' boom. Single Shaft Caterpillar. Waukesha 4 cylinder 6¼"x8" engine. Rebuilt since original manufacture. Good operating condition. Located New Jersey. Box 1104-SCC.

BUCYRUS-ERIE—1035—GASOLINE 40' BOOM clamshell. Machine including 1-yard Owen clamshell bucket. Single shaft caterpillar. 24" treads. Located Massachusetts. Box 1120-SCC.

MOORE—SPEED CRANE. 50' boom dragline, crane and 1-yard shovel. Gasoline. Located St. Paul, Minn. Box 2012-SCC.

P. & H. MODEL 600—40' BOOM GAS clamshell and 1-yard shovel. Waukesha JL-6"x7" Engine. Located North Carolina. Box 1095-SCC.

P&H MODEL 600A 1-yard 40' boom crane and gas shovel. Electric starter and lights. Waukesha 4-cylinder 6"x7" Model J. L. engine. $1500 recently spent overhauling. Good condition and appearance. Located Central Wisconsin. Box 2084-SCC.

1¼-YARD

BUCYRUS-ERIE GA-2 Gas-Air clamshell and shovel. 45-ft. clamshell boom. 1¼-yd. shovel. Single shaft cat. Recently overhauled by owner. Located New York. Box 997-SCC.

BUCYRUS-ERIE GA-3 — Gas-Air 1¼-yd. 45' boom clamshell and high lift shovel. Electric starter. Single shaft cat. Waukesha 4-cylinder 6¼"x8" engine. Few minor repairs needed. Otherwise excellent condition. Located New Jersey. Box 2058-SCC.

LINK-BELT. MODEL K-2. Gas crane. 50' boom. Also 2 extra 20' inserts to make 90'. Weight 67,000 lbs. Located St. Paul, Minn. Box 2013-SCC.

NORTHWEST MODEL 104, gasoline 1¼-yard crane and shovel. Located State of Washington. Available March 1. Box 2018-SCC.

1½-YARD

BUCYRUS-ERIE. 37-B Electric 50' boom clamshell. Long cats. 24" treads. Single motor. 60 H.P. 220 volt, 3 phase, 60 cycle. Good condition. Located New York. Box 2052-SCC.

OSGOOD—VICTOR—GAS 1½ YD. clamshell & shovel. Clamshell boom 50'. Shovel boom 23'. Wisconsin D-4—6 cylinder 5¾"x6½" engine. Reported excellent condition. Located Minneapolis. Box 1111-SCC.

LARGE SHOVELS AND DRAGLINES
2 Yards and Over

BUCYRUS-ERIE 50-B, 2-yd. steam shovel. Good operating condition. Located Central New York State. Box 2020-LSD.

BUCYRUS-ERIE 100-C. 3-yard steam shovel. Cat. mounted. Fair condition. Located Kansas. Box 2049-LSD.

BUCYRUS-ERIE 95-C. 3-yard steam shovel. Cats. installed 1925. Fair condition. Located Kansas. Box 2050-LSD.

MARION MODEL 60. 2½-yard steam shovel on railroad trucks. Good appearance and condition. Located Kansas. Box 2051-LSD.

1½-T MONIGHAN WALKER. Diesel power. 2 yard bucket, 60-foot boom. Good condition. Reasonably priced. Located Kansas. Box 742-LSD.

CLASS 320 STEAM DRAGLINE, 144-foot boom. 8-yard bucket. Located on Illinois river. A good buy. Box 750-LSD.

CLASS 230 STEAM DRAGLINE. 175-foot steel and aluminum boom. 6-yard RED ARCH bucket. Ready to work. Located near New Roads, Louisiana. Box 751-LSD.

PRICE VERY ATTRACTIVE

BUCYRUS-ERIE 50-B STEAM combination shovel and dragline, shop number 10577. 26' boom, 17' dipper handle, 2 yd. dipper. 50' boom dragline equipment, 1¾ yd. Page bucket. 1 KW 32 volt Moon electric light plant. 54"x9'7" standard coal burning locomotive-type boiler. Also 2 steel underframe flat cars on which machine is now loaded. New 1929. Moved only 250,000 yards of material. Excellent condition. Price very attractive. Located Kansas City, Mo. Deal direct with owner. Box 900-LSD.

2-T MONIGHAN WALKER, 3½-yard bucket. 70 foot boom. Good condition. Reasonably priced. Located Kansas. Box 748-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper and sticks. Chicago territory. Box 347-LSD.

CLASS 14 STEAM DRAGLINE, 60' boom. 2 cubic yard Page bucket. Locomotive-type boiler. Thoroughly overhauled and ready for service. Located, Iowa. Box 771-LSD.

2—BUCYRUS-ERIE 100-B steam shovels, worked only 15 months. Also, 2 Ingersoll-Rand Diesel compressors. Very low prices for immediate sale. H. W. Nelson, 1 Wall St., New York.

TWO 3-W MONIGHAN WALKERS, 3½ yards. 70- and 77-foot booms. Good condition. Reasonably priced. Located Louisiana. Box 745-LSD.

BUCYRUS 320-B STEAM STRIPPING shovel, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

2-W MONIGHAN WALKER, 2½ yard capacity 70-foot boom. Good condition. Priced reasonably. Located Louisiana. Box 744-LSD.

P&H MODEL 900, 3½ yard Diesel Shovel, 33-foot boom, 200 h.p. Fairbanks-Morse engine. Mounted on caterpillars. Box 828-LSD.

BUCYRUS-MONIGHAN 4-W Walking dragline, 80' boom 5½ yard Page bucket, 30' boom insert and 4-yard bucket. Located Tennessee. Box 844-LSD.

ANY FAIR OFFER ACCEPTED

Class 24 steam dragline. 100 foot boom, 5 cubic yard buckets. Skid and roller mounted. Rebuilt 1927 at a cost of $15,000. New locomotive boiler installed 1928. Will accept any fair offer. Located near Fort Worth, Texas. Box 823-LSD.

BUCYRUS-MONIGHAN MODEL 6160—Diesel Dragline. 160' boom. 6-yard drag bucket. Fairbanks-Morse Diesel engine. $15,000 extras added since machine was recently purchased. Will rent. Located Montana. Box 2068-LSD.

BUCYRUS-ERIE — TOWER EXCAVATOR. 130' head tower. 50' tail tower. 12-yard bottomless bucket. Electrical equipment 3 phase 60 cycle 4000 volts Ward Leonard. WILL RENT. Located Louisiana. Box 2069-LSD.

BUCYRUS-ERIE — 55-B — DIESEL SHOVEL. 27'6" Boom, 18' Dipper Handle, 2½ yard Dipper. Atlas Diesel Engine. New 1935. Excellent mechanical and operating condition. Located Oregon. Box 1036-LSD.

BUCYRUS-ERIE — 52-B — DIESEL 2¼ yard Shovel and Dragline. Atlas engine. Good condition. Located Eastern Pa. Box 1039-LSD.

BUCYRUS-ERIE — 100-B — STEAM SHOVEL. 3 yard Dipper. Revolving machinery, very good condition. Located Montreal, Canada. Box 1041-LSD.

BUCYRUS-MONIGHAN—MODEL 4-T — 4-yard Diesel Dragline. 110' Boom. Good Condition. Located Nebraska. Box 1047-LSD.

BUCYRUS-ERIE 50-B Steam Shovel. 30' boom, 24' dipper handle. 1 each 1½-yard and 2-yard dippers. Very good condition. Located near Albany, New York. Box 2085-LSD.

BUCYRUS-ERIE 50-B Diesel Dragline. 50' boom. 2-yard Page "M" drag bucket. Kohler Light Plant. Atlas Engine. Overhauled completely 1937. Actually used only 4 years. Good condition. Located Illinois. Box 2083-LSD.

BUCYRUS-ERIE 175-B 2 Motor AC Electric Dragline. Truck Mounted. 125' boom. 1 each 3½-yd., 4-yd., and 6-yd. drag buckets. Chain drive from main motor to intermediate shaft. Extra rotors for main and swing motors and other spare parts. Power supply 3 phase 60 cycle 440 volt. Completely overhauled since received from factory. First class operating condition. Located Kansas. Box 2082-LSD.

BUCYRUS-ERIE 5-W Diesel Dragline. 90' Boom. Electric swing. Vortex Air Oil Cleaners. Electric fan in operators platform. 5-yd. "Y" drag bucket. Fairbanks Morse 250 HP Type 33-D 5-cylinder 10"x10½" pump scavenging engine. Auxiliary Waukesha gas engine. Good working condition. Located Colorado River Aqueduct near Indio, Cal. Available March 15. Box 2079-LSD.

BUCYRUS-MONIGHAN 5-W Diesel Dragline. 80' Boom. Electric swing. Vortex Air Oil Cleaners. Electric fan in operator's platform. 6-yd. "Y" drag bucket. Fairbanks Morse 250 HP Type 33-D 5-cylinder 10"x10½" pump scavenging engine. Auxiliary Waukesha gas engine. Good working condition. Located Colorado River Aqueduct near Indio, Cal. Available March 15. Box 2080-LSD.

FOR SALE

Address all box numbers c/o EXCAVATING engineer . . . . . at South Milwaukee, Wisconsin

LARGE SHOVELS AND DRAGLINES
2 Yards and Over continued

MARION—MODEL 350—8 yard Electric Shovel. Power equipment, 3 Phase, 60 cycle, 2300 volt—Ward-Leonard Control. Mounted on railway trucks. Good condition. Located Minnesota. Box 1049-LSD.

MARION—MODEL 70—3½ yard Electric Shovel. Railway truck mounted. Power Equipment, 3 Phase, 60 cycle, 2300 volt. Good condition. Located Ohio. Box 1050-LSD.

PAGE—MODEL 220—2½ yard Diesel Dragline. 85′ Boom. Good operating condition. Located Iowa. Now operating. Box 1052-LSD.

BUCYRUS-MONIGHAN 3-T DIESEL dragline. 80-ft. steel boom, 8 cu. yd. drag bucket, 120 h.p. Fairbanks-Morse type "YVA" engine. 1500 watt Kohler light Plant. Located bank Illinois River. Box 1056-LSD.

BUCYRUS-ERIE — 75-B Electric Combination Shovel and Dragline. 29-ft. shovel boom, 20-ft. dipper handle, 2½-yard dipper, 85-ft. dragline boom with mast suspension. Suitable for power supply, 3 phase, 60 cycle, 2300 volt. Induction motors. Said to be in excellent working condition. Located Eastern Pennsylvania. Box 1058-LSD.

BUCYRUS-ERIE 50-B — 2-yard Steam Shovel. Located Texas. Low Price. Box 1059-LSD

BUCYRUS-ERIE 55-B—Extra High Lift Diesel Shovel. 35-ft. boom. 22-ft. dipper handle, 2 cu. yd. Bowl Door dipper. Caterpillar mounted. Kohler light plant. Atlas Diesel engine. Used about three months. Just like new. Located Eastern Pennsylvania. Box 1069-LSD.

PAGE—MODEL 220 — Electric dragline. 90′ boom, 3½-yard Page R.C. drag bucket. Box 1124-LSD

BUCYRUS-ERIE—CLASS 24 DIESEL dragline. 130-ft. boom, 4 cu. yd. bucket. Truck mounted. 165 h.p. Anderson Diesel engine. Friction drive. Said to be in good operating condition. Located on Mississippi River near New Orleans convenient for loading on barge. Box 1074-LSD.

BUCYRUS-ERIE—175-B TRACK MOUNTED steam shovel. 85′ boom, 58′ dipper handle, 3½-yard dipper. Good condition except dipper handle and boiler. Bargain. Located near Pittsburg, Kansas. Box 1134-LSD.

LOCOMOTIVES

LOCOMOTIVES

1 Baldwin Locomotive, 17x24, standard gauge, 45-ton, shop No. 33262.
2 Baldwin Locomotives, 19x26, standard gauge, 6-wheel, shop Nos. 39534 and 39536.
4 American Locomotives, 20x26, 60-ton, shop Nos. 5945, 5949, 42354 and 45323.
All of the above have passed State Boiler Inspection yearly; will stand 240 lb. cold water tests. At present are in actual service in Minnesota Mines. Box 1194-ME.

MISCELLANEOUS EQUIPMENT

SHOVEL ATTACHMENT

1½-yard dipper, dipper stick, boom for Link-Belt K-44 shovel. Used only a few months. Excellent condition.
ARMOUR FERTILIZER WORKS
Chicago Heights, Ill.

BABY MACK—DUMP TRUCK. 4-yard Heil Dump body and 3-ton wood coal body. Hi-Lift Heil Hoist. Pneumatic tires all around. Good condition. Located New York. Box 2048-ME.

FRUEHOFF SEMI-TRAILER with 8′ by 40′ Deck. (Can be shortened). Single rear axle with 4 wheels each with 36"x10" solid rubber tires. Air Brakes. 16 ton capacity. Excellent condition. Located New York. Box 1160-ME.

DRAG BUCKET

BUCYRUS-ERIE 1½-YARD Type "Y" Drag Bucket. Good condition. Located Kansas. Box 1166-ME

DRAGLINE EQUIPMENT

72-ft. Dragline Boom and Fairlead—Hydraulic Equipment—1 Hoist Drum—1 Drag Drum—1 Boom Suspension, Sway Brace and Suspension Cables. All suitable for application to Bucyrus-Erie Model 75-B Machine. Located Eastern Pennsylvania. Box 1060-ME.

BARGAIN—NEW DIESEL COMPRESSOR ATLAS DIESEL POWERED portable air compressor, 4 cylinder, 60 H.P. engine of dustproof type, skid mounted, self contained, complete with radiator cooling system. Direct connected to a 320 cubic feet Worthington Feather Valve Compressor. Brand new and a bargain to the first comer. Atlas Imperial Diesel Engine Company, Oakland, Calif.

HAISS EXCAVATOR — C7097, June 1930. Weight 11 tons. Needs new teeth. 33" per minute crowding. Price $1800. Box 990-ME.

CAR TRANSPORTER

CAR-TRANSPORTER or stacker with reach of 135′ and dumping height of 75′. Equipped with 4-yard aluminum car. Caterpillar-mounted and suitable for use with shovel having per hour output of 250 yards. Electric drive, 3-phase, 60-cycle, 4000-volt current. This car transporter is in excellent condition and priced to sell. Located near Kansas City, Missouri. Box 2010-ME.

SHOVEL EQUIPMENT—Late design—suitable for Bucyrus-Erie 52-B Diesel. Only handled about 4,000 yards material. Equipment located Alabama. Box 1113-ME

FRONT FOR 32 MARION

1½ CU. YD. shovel front end—new dipper—for Marion 32 steamer. Priced right. Located near Chicago. Box 857-ME.

INDUSTRIAL STEAM WRECKING DERRICK. Non-propel. Rating 50 tons at 20′ with outriggers. Located Nebraska. Box 1171-ME

BARBER-GREENE—MODEL B-44 ditcher. Located North Carolina. Box 1180-ME

USED CONTRACTORS EQUIPMENT

1—Model 100 Lincoln Revolver with 100′ boom and 12′ Gantry.
2—275 Koehring Mixers with Electric motors.
1—200-ton Blaw-Knox Bin with weighing batchers, cement scale and push button control.
1—Robinson Pneumatic cement unloader with silo.
1—20-ton Whitcomb Gasoline Dinkey, overhauled.
4—18-ton Steam Dinkeys, overhauled.
12—30-yd. Western Lift Door Air Dump cars.
12—30-yd. Koppel Drop Door Air Dump cars.
26—16-yd. K. & J. Lift Door Air Dump cars.
6—20-yd. K. & J. Lift Door Air Dump cars.
5—2-cu. yd. Blaw-Knox Roller gate Concrete Buckets.
7—70-ton 20x36 Baldwin Switchers.
1500 tons used steel sheet piling—Sections M-111, M-112 and M-115 35 to 50′ lengths.
3—Jordan spreaders excellent condition.
Located Mississippi valley. Box 2011-ME.

KOEHRING DRAG SHOVEL equipment for Model 301 machine. Used very little. Low price. Located Eastern New York State. Box 1181-ME

DRAG SHOVEL EQUIPMENT—consisting of 18′ boom, 7′6" dipper handle and ¾-yd. front-opening dipper suitable for application to Bucyrus-Erie 1020 shovel. Located Rhode Island. Box 2003-ME.

EUCLID-TUWAY 11-CU. YD. dump wagon. Hydraulic hoist. Worked only 320 hours. Located Central New York State. Box 1189-ME.

ERIE AGGREMETER BIN—80-ton capacity with 3 compartments, including weighing scales. Only handled 10,000 tons. Located Central New York State. Box 1190-ME.

MINING AND QUARRY EQUIPMENT

The following equipment is located in Minnesota. Full details on request.

3—Boilers.
12—36" gauge Koppel double truck flat cars.
6—36" gauge Peteler 4-yard two way dump cars.
4—Swing & Boom engines for Marion 31 & 36 shovels.
1—Austin-Western grader, 8′ blade and scarifier.
4—Hoists—Single and double drum.
2—Milwaukee gasoline locomotives, 7-ton 24" gauge.
3—Electric motors, 100 to 150 h.p.
8—Pumps—Steam and gasoline.
1—Special Twin City Tractor.
1—Complete Ainley Placer gold machine.

Box 833-ME.

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EXCAVATING engineer
South Milwaukee, Wisconsin

CONTRACTORS — ATTENTION — YOUR REPAIR SHOP NEEDS SOME OF THESE TOOLS

2½" Style 3 Pipe Machine for Motor Drive
20" No. 8 Vulcan & Ransom Double Spindle Grinder
60" Pond Radial Drill
Hilles & Jones—No. 000 Punch
48"x48"x12′ Pond Planer
42"x36"x8′ Niles—Bement—Pond Milling Machine
4500 lb. Fairbanks-Morse—Dormont No. 4 Platform Scale
42"x36"x8′ Cincinnati Planer
No. 2 Diamond Single Wheel Wet Grinder
3"x36" Jones & Lamson Turret Lathe
22"x48" Between Centers—Greaves & Klusman Engine Lathe

Box 2063-ME.

WANTED

INVESTOR WANTED

Active partner to invest $3,000 in well-equipped and fully experienced Road Construction Company. Prefer experienced man. Box 2077-ME.

WANTED: 36 or 37 Marion Caterpillars. Need caterpillars and axles complete. Must have very low price. Write P. O. Box 168, Pleasanton, Kansas.

WANTED: Pull Shovel Front for P&H 600; also Barber Greene or Haiss Loader. State condition, age, location and price in first reply. Edw. M. Rocho, Freeport, Ill.

WANTED: Bucyrus-Erie Diesel shovels, Models 34-B, 43-B, 19-B. State cash prices and full particulars to, B. Caten, Box 54, Postal Station D, Toronto, Canada.